MATERIAL SAFETY DATA SHEET

AND SAFE HANDLING AND DISPOSAL INFORMATION

02/14/92

CLEAN ACROSS AMERICA AND THROUGHOUT THE WORLD™

ZEP MANUFACTURING COMPANY
P.O. BOX 2015
ATLANTA, GEORGIA 30301

(599-201)

VANDALIA RENTAL
950 ENGLE RD
VANDALIA, OH 45377

ISSUE DATE: 11/25/91
SUPERSEDES: 04/21/89

ZEP FORMULA 50
PRODUCT NUMBER: 0[illegible]

SECTION I - EMERGENCY CONTACTS

TELEPHONE:
(404) 352-1680 — BETWEEN 8:00 AM - 5:00 PM (EST)

MEDICAL EMERGENCY:
(404) 435-2973
(404) 351-2952
(404) 432-2873
NON-OFFICE HOURS, WEEKENDS AND HOLIDAYS. PLEASE CALL YOUR LOCAL POISON CONTROL

TRANSPORTATION EMERGENCY:
(404) 922-0923

CHEMTREC:
1-800-424-9300 — TOLL-FREE - ALL CALLS RECORDED

DISTRICT OF COLUMBIA:
(202) 483-7616 — ALL CALLS RECORDED

SECTION II - HAZARDOUS INGREDIENTS

DESIGNATIONS	TLV (PPM)	EFFECTS (SEE REVERSE)	% IN PROD.
@ = ETHYLENE GLYCOL MONOBUTYL ETHER = 2-butoxyethanol; butyl cellosolve. CAS# 111-76-2; RTECS# KJ8575000: OSHA PEL (SKIN)- 25 ppm	25	TOX IRR CBL	< 5
= SODIUM METASILICATE = silicic acid (H2-Si-O3) disodium salt; water glass; CAS# 6834-92-0; RTECS# VV9275000: OSHA Dust Limit-2mg/m3 (for powders only).	N/D	COR	< 5
= SODIUM DODECYLBENZENE SULFONATE = linear alkyl aryl sodium sulfonate; CAS# 25155-30-0; RTECS# D36825000; OSHA PEL N/D	N/D	IRR	< 5

@ Identifies chemicals listed under SARA-Section 313 for release reporting

SECTION III - HEALTH HAZARD DATA

Special Note: MSDS data pertains to the product as dispensed from the container. Adverse health effects would not be expected under recommended conditions of use (diluted) so long as prescribed safety precautions are practiced.

Acute Effects of Overexposure:
PRODUCT IS CONSIDERED NON-TOXIC ORALLY ACCORDING TO 16 CFR 1500.3 (CODE OF FEDERAL REGULATIONS 16, FEDERAL HAZARDOUS SUBSTANCES ACT REGULATIONS, PART 1500.3). HOWEVER, NO PRODUCT SHOULD BE INTENTIALLY INGESTED. INGESTION OF AN EXCESSIVE AMOUNT OF THE PRODUCT MAY CAUSE COMPLICATIONS. PRODUCT IN CONCENTRATED FORM IS A SEVERE EYE IRRITANT. OVER-EXPOSURE MAY LEAD TO EYE TISSUE DAMAGE WHICH CAN BE PERMANENT. THIS PRODUCT MAY CAUSE SLIGHT SKIN IRRITATION. OVER-EXPOSURE BY INHALATION MAY CAUSE RESPIRATORY IRRITATION. EXISTING EYE OR RESPIRATORY DISORDERS MAY BE AGGRAVATED BY EXPOSURE.

Chronic Effects of Overexposure:
REPEATED EYE EXPOSURE MAY PRODUCE CHRONIC INFLAMMATION OF THE EYE OR CORNEAL DAMAGE. ANIMAL STUDIES INDICATE A POTENTIAL FOR LIVER, KIDNEY, OR RED BLOOD CELL DAMAGE. RELEVANCE OF THESE STUDIES OR EXPOSURE LEVELS WHICH MIGHT PRODUCE THESE EFFECTS IN HUMANS HAS NOT BEEN ESTABLISHED. NONE OF THE INGREDIENTS ARE LISTED AS CARCINOGENS BY IARC, NTP, OR OSHA.

Est'd PEL/TLV: NOT ESTABLISHED **Primary Routes of Entry:** INH, SKIN.

HMIS Codes: HEALTH 2;FLAM. 0;REACT. 0;PERS PROTECT. B ;CHRONIC HAZ. YES

FIRST AID PROCEDURES:
Skin: FLUSH CONTAMINATED SKIN WITH PLENTY OF WATER. CONSULT A PHYSICIAN IF IRRITATION DEVELOPS.
Eyes: IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES, OCCASIONALLY LIFTING UPPER AND LOWER LIDS. GET MEDICAL ATTENTION AT ONCE.
Inhale: MOVE EXPOSED PERSON TO FRESH AIR. IF IRRITATION PERSISTS, GET MEDICAL ATTENTION PROMPTLY.
Ingest: IF THIS PRODUCT IS SWALLOWED, DO NOT INDUCE VOMITING. IF VICTIM IS CONSCIOUS GIVE PLENTY OF WATER TO DRINK. GET MEDICAL ATTENTION AT ONCE.

SECTION IV - SPECIAL PROTECTION INFORMATION

Protective Clothing: WEARING NEOPRENE OR NITRILE GLOVES IS RECOMMENDED WHEN PROLONGED EXCESSIVE CONTACT OCCURS (eg IMMERSING HANDS)
Eye Protection: WEAR TIGHT-FITTING SPLASH-PROOF SAFETY GLASSES ESPECIALLY IF CONTACT LENSES ARE WORN.
Respiratory Protection: KEEP FACE AWAY FROM SPRAY MIST AND DO NOT BREATHE VAPORS.
Ventilation: PROVIDE LOCAL EXHAUST/VENTILATION AS NEEDED TO KEEP CONCENTRATION OF VAPORS BELOW EXPOSURE LIMITS (PEL/TLV).

SECTION V - PHYSICAL DATA

Boiling Point (°F):	~220	**Specific Gravity:**	1.07	**Vapor Pressure (mmHg):**	N/D
Percent Volatile by Volume (%):	85%	**Vapor Density (air=1):**	N/D	**Evaporation Rate (WATER = 1):**	1.0
Solubility in Water:	COMPLETE	**pH (concentrate):**	12.5-13.0	**pH (use dilution of 1% SOLUTION):**	1% SOLUTION

Appearance and Odor: A THIN, DARK BLUE LIQUID WITH SLIGHT "BUTYL" ODOR.

SECTION VI - FIRE AND EXPLOSION DATA

Flash Point (°F) (method used): N/D (TCC)
Flammable Limits: LEL N/A UEL N/A
Extinguishing Media: NON-COMBUSTIBLE.
Special Fire Fighting: WEAR SELF-CONTAINED POSITIVE PRES. BREATHING APPARATUS.
Unusual Fire Hazards: NONE

SECTION VII - REACTIVITY DATA

Stability: STABLE
Incompatibility (avoid): STRONG ACIDS AND OXIDIZING AGENTS
Polymerization: WILL NOT OCCUR.
Hazardous Decomposition: CARBON DIOXIDE, CARBON MONOXIDE, AND OTHER UNIDENTIFIED ORGANIC COMPOUNDS.

SECTION VIII - SPILL AND DISPOSAL PROCEDURES

Steps to be Taken in Case Material is Released or Spilled:
OBSERVE SAFETY PRECAUTIONS IN SECTIONS 4 & 8 DURING CLEAN-UP. ABSORB SPILL ON AN INERT ABSORBENT MATERIAL (eg ZEP-O-ZORB); PICK UP & PLACE IN A CLEAN D.O.T. SPECIFICATION CONTAINER FOR DISPOSAL. WASH AREA THOROUGHLY WITH A DETERGENT SOLUTION AND THEN RINSE WELL WITH WATER.

Waste Disposal Method:
LIQUIDS CANNOT BE SENT TO LANDFILLS UNLESS SOLIDIFIED. UNUSABLE PRODUCT AND SOME COLLECTED, SPENT USE-DILUTIONS MAY REQUIRE DISPOSAL AS A HAZARDOUS WASTE AT A PERMITTED TREATMENT/STORAGE/DISPOSAL FACILITY. IN MOST STATES HAZARDOUS WASTES IN TOTAL AMOUNTS OF 220 LBS OR LESS PER MONTH MAY BE DISPOSED OF IN A CHEMICAL OR INDUSTRIAL WASTE LANDFILL. IF COMPANY EFFLUENT IS ULTIMATELY TREATED BY A PUBLICLY OWNED TREATMENT WORKS, NEUTRALIZATION OF SPENT TANK SOLUTIONS WITH SUBSEQUENT DISCHARGE TO THE SEWER MAY BE POSSIBLE. CONSULT LOCAL, STATE AND FEDERAL AGENCIES FOR PROPER DISPOSAL METHOD IN YOUR AREA.

RCRA Hazardous Waste Numbers: D002 (SEE ABOVE)

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be Taken When Handling and Storing:
STORE TIGHTLY CLOSED CONTAINER IN A DRY AREA AT TEMPS. BETWEEN 40-120 DEGREES F. KEEP PRODUCT OUT OF EYES. DO NOT BREATHE SPRAY MISTS OR VAPORS. CLOTHING OR SHOES WHICH BECOME CONTAMINATED WITH SUBSTANCE SHOULD BE REMOVED PROMPTLY AND NOT REWORN UNTIL THOROUGHLY CLEANED. KEEP OUT OF THE REACH OF CHILDREN.

SECTION X - TRANSPORTATION DATA

DOT Proper Shipping Name: NONE
DOT Hazard Class: N/A
DOT I.D. Number: N/A
DOT Label/Placard: NONE
EPA TSCA Chemical Inventory: ALL INGREDIENTS ARE LISTED
EPA CWA 40CFR Part 117 substance (RQ in a single container): : SODIUM DODECYLBENZENE SULFONATE 1000 #

NOTICE

Thank you for your interest in, and use of, Zep products. Zep Manufacturing Co. is pleased to be of service to you by supplying this Material Safety Data Sheet for your files. Zep Manufacturing is concerned for your health and safety. Zep products can be used safely with proper protective equipment and proper handling practices consistent with label instructions and the MSDS. Before using any Zep product, be sure to read the complete label and the Material Safety Data Sheet.

As a further word of caution, Zep wishes to advise that serious accidents have resulted from the misuse of "emptied" containers. "Empty" containers retain residue (liquid and/or vapor) and can be dangerous. DO NOT pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, or other sources of ignition; they may explode or develop harmful vapors and possibly cause injury or death. Clean empty containers by triple rinsing with water or an appropriate solvent. Empty containers must be sent to a drum reconditioner before reuse.

TERMS AND ABBREVIATIONS USED IN THE MSDS; BY SECTION ALPHABETICALLY

SECTION II: HAZARDOUS INGREDIENTS

CAR: Carcinogen - A chemical listed by the National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC) or OSHA as a definite or possible human cancer causing agent.

CAS #: Chemical Abstract Services Registry Number - A universally accepted numbering system for chemical substances.

CSL: Combustible - At temperatures between 100°F and 200°F chemical gives off enough vapor to ignite if a source of ignition is present as tested with a closed cup tester.

CNS: Central Nervous System depressant reduces the activity of the brain and spinal cord.

COR: Corrosive - Causes irreversible alterations in living tissue (e.g. burns).

DESIGNATIONS: Chemical and common names of hazardous ingredients.

EIR: Eye Irritant Only - Causes reversible reddening and/or inflammation of eye tissues.

EXPOSURE LIMITS: The time weighted average (TWA) airborne concentration at which most workers can be exposed without any expected adverse effects. Primary sources include ACGIH TLV's, and OSHA PEL's (TWA, STEL and ceiling limits).

ACGIH: American Conference of Governmental Industrial Hygienists.

CEILING: The concentration that should not be exceeded in the workplace during any part of the working exposure.

OSHA: Occupational Safety and Health Administration

PEL: Permissible Exposure Limit - A set of time weighted average exposure values, established by OSHA, for a normal 8-hour day and a 40-hour work week.

PPM: Parts per million - unit of measure for exposure limits.

(S); SKIN: Skin contact with substance can contribute to overall exposure

STEL: Short Term Exposure Limit - Maximum concentration for a continuous 15-minute exposure period.

TLV: Threshold Limit Value - A set of time weighted average exposure limits, established by the ACGIH, for a normal 8-hour day and a 40-hour work week.

FBL: Flammable - At temperatures under 100°F, chemical gives off enough vapor to ignite if a source of ignition is present as tested with a closed cup tester.

HAZARDOUS INGREDIENTS: Chemical substances determined to be potential health or physical hazards by the criteria established in the OSHA Hazard Communication Standard - 29 CFR 1910.1200

HTX: Highly toxic - the probable lethal dose for 70 kg (150 lb.) man and may be approximated as less than 6 teaspoons (2 tablespoons).

IRR: Irritant - Causes reversible effects in living tissues (e.g. inflammation) - primarily skin and eyes.

N/A: Not Applicable - Category is not appropriate for this product.

N/D: Not Determined - Insufficient information for a determination for this item

RTECS #: Registry of Toxic Effects of Chemical Substances - an unreviewed listing of published toxicology data on chemical substances

SARA: Superfund Amendments and Reauthorization Act - Section 313 designates chemicals for possible reporting for the Toxics Release Inventory.

SEN: Sensitizer - Causes allergic reaction after repeated exposure

TOX: Toxic - The probable lethal dose for a 70 kg (150 lb.) man is one ounce (2 tablespoons) or more.

SECTION III: HEALTH HAZARD DATA

ACUTE EFFECT: An adverse effect on the human body from a single exposure with symptoms developing almost immediately after exposure or within a relatively short time.

CHRONIC EFFECT: Adverse effects that are most likely to occur from repeated exposure over a long period of time

ESTD PEULV: This estimated, time-weighted average, exposure limit, developed by using a formula provided by the ACGIH, pertains to airborne concentrations from the product as a whole. This value should serve as guide for providing safe workplace conditions to nearly all workers.

HMIS CODES: Hazardous Material Identification System - a rating system developed by the National Paint and Coating Association for estimating the hazard potential of a chemical under normal workplace conditions. These risk estimates are indicated by a numerical rating given in each of three hazard areas (Health/Flammability/Reactivity) ranging from a low of zero to a high of 4. A chronic hazard is indicted with a yes. Consult HMIS training guides for Personal Protection letter codes which indicate necessary protective equipment

PRIMARY ROUTE OF ENTRY: The way one or more hazardous ingredients may enter the body and cause a generalized-systemic or specific-organ toxic effect.

ING: Ingestion - A primary route of exposure through swallowing of material.

INH: Inhalation - A primary route of exposure through breathing of vapors.

SKIN: A primary route of exposure through contact with the skin.

SECTION IV: SPECIAL PROTECTION INFORMATION

Where respiratory protection is recommended, use only MSHA and NIOSH approved respirators and dust masks.

MSHA: Mine Safety and Health Administration

NIOSH: National Institute for Occupational Safety and Health.

SECTION V: PHYSICAL DATA

EVAPORATION RATE: It refers to the rate of change from the liquid state to the vapor state at ambient temperature and pressure in comparison to a given substance (e.g. water).

pH: A value representing the acidity or alkalinity of an aqueous solution (Acidic pH = 1, Neutral pH = 7; Alkaline pH = 14)

PERCENT VOLATILE: The percentage of the product (by or solid) that will evaporate at 212°F and ambient pres

SOLUBILITY IN WATER: A description of the ability of product to dissolve in water

SECTION VII: REACTIVITY DATA

HAZARDOUS DECOMPOSITION: Breakdown products expected to be produced upon product decomposition or fire.

INCOMPATIBILITY: Material contact and conditions to avoid to prevent hazardous reactions

POLYMERIZATION: Indicates the tendency of the product's molecules to combine in a chemical reaction releasing excess pressure and heat.

STABILITY: Indicates the susceptibility of the product to spontaneously and dangerously decompose.

SECTION VIII: SPILL AND DISPOSAL PROCEDURES

RCRA WASTE NOS: RCRA (Resource Conservation and Recovery Act) waste codes (40 CFR 261) applicable to the disposal of spilled or unusable product from the original container.

SECTION X: TRANSPORTATION DATA

CWA: Clean Water Act

RQ: Reportable Quantity - The amount of the specific ingredient that, when spilled to the ground and can solid storm sewer or natural watershed, must be reported to the National Response Center, and other regulatory agencies.

TSCA: Toxic Substances Control Act - a federal law requiring all commercial chemical substances to appear on an inventory maintained by the EPA

DISCLAIMER

All statements, technical information and recommendation contained herein are based on available scientific tests and data which we believe to be reliable. The accuracy and completeness of such data are not warranted or guaranteed. We cannot anticipate all conditions under which the information and our products, or the products of other manufacturers in combination with our products, may be used. Zep assumes no liability or responsibility for loss or damage resulting from the improper use or handling of our products, from incompatible product combinations, or from the failure to follow instructions, warnings, and advisories in the product's label and Material Safety Data Sheet.

(Notice Revised 8/91)

Enthone-OMI, Inc.

a subsidiary of ASARCO

MATERIAL SAFETY DATA SHEET

ENTHONE

ENBOND® Q-527

P.O. BOX 1900
NEW HAVEN, CT 06508

(203) 934-8611

24 HOUR EMERGENCY PHONE NUMBERS
CHEMTREC 800-424-9300

NON-EMERGENCY PHONE NUMBERS
ENTHONE 203-934-8611
UDYLITE 313-497-9100
SEL-REX 313-497-9100

PRODUCT CODE#: 2132
DATE ISSUED: 10/2/89
SUPERCEDES: 9/24/87
PREPARER: S.D. Koch

II. HAZARDOUS INGREDIENTS

COMPONENT	COMMON NAME	CAS NO.	OSHA-PEL	ACGIH-TLV	%
Sodium hydroxide	Caustic Soda	1310-73-02	2mg/m3	2mg/m3	>10
Sodium metasilicate		6834-92-0	2mg/m3	2mg/m3	>40

III. PHYSICAL PROPERTIES

SPECIFIC GRAVITY (WATER =1)	NI	BOILING POINT, °F	NA
EVAP.RATE (BUTYL ACETATE=1)	NA	MELTING POINT, °F	NI
VAPOR PRESSURE, mmHg	NA	SOLUBILITY IN WATER	essentially complete
VAPOR DENSITY (AIR=1)	NA	APPEARANCE	white powder
pH (AS IS)	NA	ODOR	insignificant

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT, °F	None	FLAMMABLE LIMITS (AIR)	NA	LEL	NA	UEL

EXTINGUISHING MEDIA

[X] Not Combustible [X] Water fog or spray [X] Carbon Dioxide [ ] Dry Chemical [ ] Alcohol Foam [X] Foam [ ] Sand or Earth

SPECIAL FIRE FIGHTING PROCEDURES

Wear self-contained breathing apparatus (SCBA) and complete personal protective equipment when potential for exposure to vapors or products of combustion exists.

UNUSUAL FIRE AND EXPLOSION HAZARDS

In the presence of water, material may react with amphoteric metals (such as aluminum, zinc, or tin) generating hydrogen gas which will burn or explode if ignited.

V. HEALTH HAZARD DATA

EFFECTS OF ACUTE EXPOSURE:

INHALATION:	Dust may damage upper respiratory tract and lung tissue which may cause chemical pneumonia depending upon severity of exposure.
INGESTION:	Can cause severe burns to mouth, throat, esophagus, and stomach. Material is a systemic poison to kidneys, liver and gastrointestinal tract; toxic effect may not appear immediately. May be fatal.
SKIN:	Can cause severe burns.
EYES:	Causes severe burns with damage to eyes and possible blindness.

EFFECTS OF CHRONIC EXPOSURE:

May cause ulceration of respiratory tract and possibly lung cancer.

CARCINOGEN: Not listed by NTP, IARC, OSHA

REFERENCE:

EMERGENCY AND FIRST AID PROCEDURES

INHALATION:	Remove person from contaminated area. If breathing has stopped, resuscitate and administer oxygen if available. Seek immediate medical attention.
INGESTION:	Never give anything by mouth to an unconscious person, obtain immediate medical attention. If vomiting occurs spontaneously, keep airway clear. If swallowed DO NOT INDUCE VOMITING, give large amounts of water. Seek immediate medical attention.
SKIN:	Immediately wash contaminated skin with plenty of water for 15 minutes. Remove contaminated clothing and footwear. Wash clothing before reuse. Discard footwear if it cannot be decontaminated. Seek immediate medical attention.
EYES:	Immediately flush eyes with plenty of water for at least 15 minutes holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds of exposure is essential to minimize damage. Seek immediate medical attention.

VI. PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL PROCEDURES:

Avoid contact with skin, eyes, and clothing. Wear protective equipment (See Section VII). Sweep or shovel spilled material into clean steel drum and cover. Flush spill area with copious amounts of water and neutralize residual traces. Dispose of in accordance with Local, State, and Federal regulations.

STORAGE AND HANDLING PRECAUTIONS:

Store in a cool, dry place. Keep away from acids and organic compounds. Loosen cover cautiously when opening.

ADDITIONAL INFORMATION:

Wash thoroughly after handling.

VII. CONTROL MEASURES

VENTILATION: Local exhaust recommended.

RESPIRATOR: Use NIOSH approved respirator when air concentration is greater than the TLV or PEL. Use cartridge filter for caustic dust.

EYE PROTECTION: [ ] Safety glasses [X] Chemical safety goggles [X] Face shield

PROTECTIVE GLOVES: [X] Neoprene [X] Natural rubber Other:

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:

Chemically resistant coveralls, hat, and shoes or boots.

WORK/HYGENIC PRACTICES:

Emergency eye wash and safety shower should be available. Wash thoroughly after handling.

ADDITIONAL INFORMATION:

For waste disposal of operating solutions consult Enthone-OMI Waste Disposal Procedures. For major spills consult Enthone-OMI for disposal assistance. Dispose of in accordance with Local, State, and Federal regulations.

CAS = Chemical Abstract Service
NI = No relevant information available
NA = Not applicable
Trade Secret = Claimed as allowed under 29 CFR 1910.1200

PEL = OSHA Permissible Exposure Limit
TLV = ACGIH Threshold Limit Value
NTP = National Toxicology Program
IARC = Int'l Agency for Research on Cancer

VIII. REACTIVITY DATA

X	Stable	CONDITIONS TO AVOID:	Stable under normal conditions. See Incompatibility information.
	Unstable		

INCOMPATABILITY (Materials to avoid): Acids, amphoteric metals (such as aluminum, zinc), organic compounds.

HAZARDOUS DECOMPOSITION PRODUCTS: None known.

HAZARDOUS POLYMERIZATION		May occur	CONDITIONS TO AVOID: NA
	X	Will not occur	

IX. ADDITIONAL INFORMATION

This Material Safety Data Sheet may be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Enthone-OMI, Inc. furnishes the data contained herein in good faith at customer's request without liability or legal responsibility for same whatsoever, and no warranty or guarantee, express or implied, is made with respect to such data; nor does Enthone-OMI, Inc. grant permission, recommendation, or inducement to infringe any patent whether owned by Enthone-OMI, Inc. or others. The data is offered solely for your information and consideration. Since conditions of use are beyond Enthone-OMI's control, user assumes all responsibility and risk.

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a subsidiary of ASARCO

MATERIAL SAFETY DATA SHEET

ENTHONE

ENPREP™ 168E

P.O. BOX 1900
NEW HAVEN, CT 06508

(203) 934-8611

24 HOUR EMERGENCY PHONE NUMBERS
CHEMTREC 800-424-9300

NON-EMERGENCY PHONE NUMBERS

ENTHONE	203-934-8611
UDYLITE	313-497-9100
SEL-REX	313-497-9100

PRODUCT CODE#: 2118
DATE ISSUED: 10/4/93
SUPERCEDES: 1/17/92 (Enbond HD-168)
PREPARER: L.T. Horbal

II. HAZARDOUS INGREDIENTS

COMPONENT	COMMON NAME	CAS NO.	OSHA-PEL	ACGIH-TLV	%
Sodium hydroxide	Caustic soda	1310-73-2	2mg/m3	2mg/m3	<45
Sodium metasilicate		6834-92-0	2mg/m3	2mg/m3	<10
Triethanolamine	TEA	102-71-6	NI	3.1mg/m3	<5

III. PHYSICAL PROPERTIES

SPECIFIC GRAVITY (WATER =1)	NI	BOILING POINT, °F	NA
EVAP.RATE (BUTYL ACETATE=1)	NA	MELTING POINT, °F	NI
VAPOR PRESSURE, mmHg	NA	SOLUBILITY IN WATER	essentially complete
VAPOR DENSITY (AIR=1)	NA	APPEARANCE	off-white powder
pH (AS IS)	NA	ODOR	caustic

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT, °F	NA	FLAMMABLE LIMITS (AIR)	NA	LEL	NA	UEL

EXTINGUISHING MEDIA

[X] Not Combustible [ ] Water fog or spray [ ] Carbon Dioxide [ ] Dry Chemical [ ] Alcohol Foam [ ] Foam [ ] Sand or Earth

SPECIAL FIRE FIGHTING PROCEDURES

Reaction with water may be highly exothermic.

UNUSUAL FIRE AND EXPLOSION HAZARDS

In the presence of water, material may react with amphoteric metals (such as aluminum, zinc, or tin) generating hydrogen gas which will burn or explode if ignited.

V. HEALTH HAZARD DATA

EFFECTS OF ACUTE EXPOSURE:

INHALATION: Dust may damage upper respiratory tract and lung tissue which may cause chemical pneumonia depending upon severity of exposure.

INGESTION: Can cause severe burns to mouth, esophagus and stomach.

SKIN: Can cause severe burns.

EYES: Causes severe burns with damage to eyes and possible blindness.

EFFECTS OF CHRONIC EXPOSURE:

Superficial destruction of skin or primary irritant dermatitis. Inhalation of dust may result in irritation or damage to respiratory tract tissue and increased susceptibility to respiratory illness.

CARCINOGEN: Not listed by NTP, IARC, OSHA.

REFERENCE:

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove person from contaminated area. If breathing has stopped, resuscitate and administer oxygen if available.
Seek immediate medical attention.

INGESTION: Never give anything by mouth to an unconscious person, obtain immediate medical attention. If vomiting occurs spontaneously, keep airway clear. If swallowed DO NOT INDUCE VOMITING, give large amounts of water.
Seek immediate medical attention.

SKIN: Immediately wash contaminated skin with plenty of water for 15 minutes. Remove contaminated clothing and footwear. Wash clothing before reuse. Discard footwear if it cannot be decontaminated.
Seek immediate medical attention.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds of exposure is essential to minimize damage.
Seek immediate medical attention.

VI. PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL PROCEDURES:

Avoid contact with skin, eyes and clothing. Wear protective equipment (See Section VII). Sweep or shovel spilled material into clean steel drum and cover. Flush spill area with copious amounts of water and neutralize residual traces with dilute acid such as dilute acetic acid. Dispose of in accordance with Local, State and Federal regulations.

STORAGE AND HANDLING PRECAUTIONS:

Store in a cool, dry place. Keep away from acids and organic compounds. Loosen cover cautiously when opening.

ADDITIONAL INFORMATION:

Wash thoroughly after handling.

VII. CONTROL MEASURES

VENTILATION: Local exhaust recommended.

RESPIRATOR: Use NIOSH approved respirator when air concentration is greater than the TLV or PEL. Use cartridge filter for caustic dust.

EYE PROTECTION: [X] Safety glasses [ ] Chemical safety goggles [X] Face shield

PROTECTIVE GLOVES: [X] Neoprene [ ] Natural rubber Other:

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:

Chemically resistant coveralls, hat, and shoes or boots.

WORK/HYGENIC PRACTICES:

Emergency eye wash and safety shower should be available. Wash thoroughly after handling.

ADDITIONAL INFORMATION:

For waste disposal of spilled or contaminated product follow Enthone-OMI Waste Disposal Procedures. If necessary, consult Enthone-OMI for disposal assistance. Dispose of in accordance with Local, State and Federal regulations.

CAS = Chemical Abstract Service
NI = No relevant information available
NA = Not applicable
Trade Secret = Claimed as allowed under 29 CFR 1910.1200

PEL = OSHA Permissible Exposure Limit
TLV = ACGIH Threshold Limit Value
NTP = National Toxicology Program
IARC = Int'l Agency for Research on Cancer

VIII. REACTIVITY DATA

X	Stable	CONDITIONS TO AVOID:	Stable under normal conditions. See Incompatibility information.
	Unstable		
INCOMPATABILITY (Materials to avoid):			Acids, amphoteric metals (such as aluminum, zinc), organic compounds, heated water.
HAZARDOUS DECOMPOSITION PRODUCTS:			None known.
HAZARDOUS POLYMERIZATION		May occur	CONDITIONS TO AVOID: NA
	X	Will not occur	

IX. ADDITIONAL INFORMATION

This product does not contain any chemicals subject to the reporting requirements of SARA, TITLE III, Section 313 (40CFR372) or known to the State of California to cause cancer or birth defects (to comply with California Statute [Section 25249.6]).

OxyChem®

Responsible Care:® A Public Commitment

MATERIAL SAFETY DATA SHEET

MSDS NUMBER : M32415

MSDS DATE : 11-23-93

PRODUCT NAME : CAUSTIC SODA LIQUID (ALL GRADES)

(For specific products - see Section XI)

24 HOUR EMERGENCY PHONE: 1-800-733-3665 OR 716-278-7021

I. PRODUCT IDENTIFICATION

HMIS HAZARD RATINGS

HEALTH HAZARD 3 **FIRE HAZARD 0** **REACTIVITY 2**

Based on the National Paint & Coatings Association HMIS rating system.

SARA/TITLE III HAZARD CATEGORIES (See Section X)

Immediate (ACUTE) Health: YES
Delayed (Chronic) Health: NO
Fire Hazard: NO
Reactive Hazard: YES
Sudden Release of Pressure: NO

MANUFACTURER'S NAME AND ADDRESS: Occidental Chemical Corporation, Customer Service, Occidental Tower, P O Box 809050, Dallas, Texas 75380 Telephone (1-800-752-5151)

CHEMICAL NAME: Sodium Hydroxide CAS NUMBER: 1310-73-2

SYNONYMS/COMMON NAMES: Sodium Hydroxide; NaOH

CHEMICAL FORMULA: NaOH

DOT PROPER SHIPPING NAME: Sodium Hydroxide, Solution

DOT HAZARD CLASS: 8

DOT IDENTIFICATION NUMBER: UN1824

DOT PACKING GROUP: II

DOT HAZAROUS SUBSTANCE: RQ 1000 lbs. (Sodium Hydroxide)

DOT MARINE POLLUTANT: NA

ADDITIONAL DESCRIPTION REQUIREMENT: NA

CAS = Chemical Abstract Service Number
PEL = OSHA Permissible Exposure Limit
TLV = ACGIH Threshold Limit Value, Current
ND = No relevant information found or not available
CORP = Corporate Exposure Limit
* = See Chronic Effects Information
NA = Not applicable

II. HEALTH HAZARD INFORMATION

EMERGENCY AND FIRST AID PROCEDURES

EYES:

OBJECT IS TO FLUSH MATERIAL OUT IMMEDIATELY THEN GET MEDICAL ATTENTION. IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes, holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN:

IMMEDIATELY wash with plenty of water for at least 15 minutes. Remove contaminated clothing and footwear. Wash clothing before reuse and discard footwear which cannot be decontaminated. GET MEDICAL ATTENTION IMMEDIATELY.

INHALATION:

Remove to fresh air. If breathing is difficult have trained person administer oxygen. If respiration stops, give mouth-to-mouth resuscitation. GET MEDICAL ATTENTION.

INGESTION:

NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. If available, give several glasses of milk. If vomiting occurs spontaneously, keep airway clear. GET MEDICAL ATTENTION IMMEDIATELY.

ROUTES OF EXPOSURE

INHALATION:

Breathing dust, mist or spray may cause damage to the upper respiratory tract and lung tissue proper which could produce chemical pneumonia, depending upon severity of exposure.

SKIN:

Contact produces severe burns and destroys tissues. Irritation may be delayed.

EYE CONTACT:

Causes severe burns that result in damage to the eyes and possibly blindness.

INGESTION:

Causes severe burns to mucous membranes of the mouth, throat, esophagus, and stomach.

EFFECTS OF OVEREXPOSURE

ACUTE:

Corrosive to all body tissues by all routes of exposure. The effect of local dermal exposure may consist of multiple areas of superficial destruction of the skin or of primary irritant dermatitis. Similarly, inhalation of dust, spray, or mist may result in varying degrees of irritation or damage to the respiratory tract tissues and an increased susceptibility to respiratory illness.

CHRONIC:

No known chronic effects.

II. HEALTH HAZARD INFORMATION (Continued)

TOXICOLOGY DATA:

Caustic soda is a corrosive material.

Sodium Hydroxide:

Acute dermal LD50	(rabbit)	1350 mg/kg

Human Dermal Exposure

Regardless of concentrations, the severity of damage and extent of its irreversibility increases with length of contact time. Prolonged contact with sodium hydroxide solutions of =>1% can cause a high degree of tissue destruction. The latent period, following skin contact during which no sensation of irritation occurs, varies from several hours for 0.4 - 4% solution to 3 minutes with concentrations of 25% or greater.

III. IMPORTANT COMPONENTS

CAS NUMBER / NAME
7732185 Water

EXPOSURE LIMITS
PEL:Not Established
TLV:Not Established

PERCENTAGE
VOL ND
WT 48.50-91

COMMON NAMES:

Listed On(List Legend Below):
19 23

1310732 Sodium hydroxide (Na(OH))

EXPOSURE LIMITS
PEL:2 mg/m3, Ceiling
TLV:2 mg/m3, Ceiling

PERCENTAGE
VOL ND
WT 9-51.50

COMMON NAMES:
CAUSTIC SODA

Listed On(List Legend Below):
13 18 21

7647145 Sodium chloride (NaCl)

EXPOSURE LIMITS
PEL:None established
TLV:None established

PERCENTAGE
VOL ND
WT 0-1.30

COMMON NAMES:
SALT

Listed On(List Legend Below):
23

7775099 Chloric acid, sodium salt

EXPOSURE LIMITS
PEL:Not Established
TLV:Not Established

PERCENTAGE
VOL ND
WT 0-0.30

COMMON NAMES:
SODIUM CHLORATE

Listed On(List Legend Below):
12 21

All components of this product that are required to be on the TSCA Inventory are listed on the inventory.

Not listed as carcinogen - IARC, NTP, OSHA

LIST LEGEND

12 PA HAZARDOUS SUBSTANCE
13 PA ENVIROMENTAL HAZ SUBSTANCE
18 NY HAZARDOUS SUBSTANCES
19 PA REQUIREMENT- 3% OR GREATER
21 NJ SPECIAL HEALTH HAZ SUB
23 NJ REQUIREMENT- 1% OR GREATER

IV. FIRE AND EXPLOSION DATA

FLASH POINT: NA AUTOIGNITION TEMPERATURE: Nonflammable

FLAMMABLE LIMITS IN AIR, % BY VOLUME- UPPER: NA
LOWER: NA

EXTINGUISHING MEDIA:

This product is not combustible. Foam, carbon dioxide or dry chemical may be used where this product is stored.

SPECIAL FIRE FIGHTING PROCEDURES:

Wear full protective clothing. Avoid direct contact of this product with water as this can cause a violent exothermic reaction.

UNUSUAL FIRE AND EXPLOSION HAZARD:

Direct contact with water can cause a violent exothermic reaction. See Reactivity Section.

V. SPECIAL PROTECTION

VENTILATION REQUIREMENTS:

Special ventilation is not required under normal use. Use local exhaust ventilation where dust, mist, or spray may be generated.

NOTE: Where carbon monoxide or other reaction products may be generated, special ventilation may be required.

SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY:

Respiratory protection is not required under normal use. Use NIOSH/MSHA approved respirators where dust, mist, or spray may be generated.

EYE:

Wear chemical safety goggles plus full face shield to protect against splashing (ANSI Z87.1).

GLOVES:

Wear chemical resistant gloves such as natural or butyl rubber. Gloves may be decontaminated by washing with mild soap and water.

OTHER CLOTHING AND EQUIPMENT:

Impervious protective clothing and chemically resistant safety shoes should be worn to minimize contact. Wash contaminated clothing with soap and water and dry before reuse. Emergency shower and eyewash facility should be in close proximity. (ANSI Z358.1).

VI. PHYSICAL DATA

PHYSICAL STATE: LIQUID	Concentration, Weight % 10	20	30	40	50
BOILING POINT,@ 760 mm Hg, °C:	110	113	119	129	144
FREEZING POINT, °C:	-10	-32	0	15	12
VAPOR PRESSURE, mm Hg @ 60°C:	135	110	76	46	13
SPECIFIC GRAVITY @15.6°C/15.6°C:	1.11	1.22	1.33	1.43	1.53
DENSITY, lbs/gallon @ 15.6°C/15.6°C:	9.27	10.20	11.11	11.97	12.76
SOLUBILITY IN H2O, % by Wt.	.....completely soluble.....				
VAPOR DENSITY (Air = 1):	Not Applicable				
APPEARANCE AND ODOR:	Clear liquid with no distinct odor				
ODOR THRESHOLD (PPM):	Not Available				
EVAPORATION RATE:	Not Known				
COEFFICIENT WATER/OIL DISTRIBUTION:	Not Available				
pH:	7.5% solution has pH 14.0				

VII. REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY:

Under normal conditions, this product is stable.

INCOMPATIBILITY:

See Handling and Storage Section. Avoid contact with water. This product may be added slowly to water or acids with dilution and agitation to avoid a violent exothermic reaction. When handling this product, avoid contact with aluminum, tin, zinc, and alloys containing these metals. Do not mix with strong acids without dilution and agitation to prevent violent or explosive reaction. Avoid contact with leather, wool, acids, organic halogen compounds and organic nitro compounds.

HAZARDOUS DECOMPOSITION PRODUCTS:

None known.

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION:

Material is not known to polymerize.

VIII. HANDLING AND STORAGE

HANDLING AND STORAGE PRECAUTIONS:

Do not get into eyes, on skin, on clothing.
Avoid breathing dust, mists, or spray.
Do not take internally.
Use with adequate ventilation and wear respiratory protection when exposure to dust, mist or spray is possible.
When handling, wear chemical splash goggles, face shield, rubber gloves and protective clothing.
Wash thoroughly after handling or contact - exposure can cause burns which are not immediately painful or visible.
Keep container closed.
Product can react violently with water, acids, and other substances - read Special Mixing and Handling Instructions below carefully before using.
Product is corrosive to tin, aluminum, zinc and alloys containing these metals, and will react violently with these metals in powder form.
Hazardous carbon monoxide gas can form upon contact with food and beverage products in enclosed spaces and can cause death. Follow appropriate tank entry procedures (ANSI Z117.1).

SPECIAL MIXING AND HANDLING INSTRUCTIONS

Product can react violently with water. Considerable heat is generated when product is mixed with water. Therefore, when making solutions always carefully follow these steps:

ALWAYS wear ALL protective clothing described above. NEVER add water to product. ALWAYS add product - with constant stirring - slowly to surface of lukewarm (80-100°F) water, to assure product is being completely dissolved as it is added.

If product is added too rapidly, or without stirring, and becomes concentrated at bottom of mixing vessel, excessive heat may be generated, resulting in DANGEROUS boiling and spattering, and a possible IMMEDIATE AND VIOLENT ERUPTION of highly caustic solution.

NOTE: Never add more product than can be absorbed by solution while maintaining temperature below 200°F (@ sea level) to prevent boiling and spattering.

Product can react EXPLOSIVELY with acids, aldehydes, and many other organic chemicals - when mixing product with solutions containing such chemicals, follow all of above mixing instructions, and add product very gradually, while stirring constantly.

ALWAYS empty and clean containers of all residues before adding product, to avoid possible EXPLOSIVE reaction between product and unknown residue.

Returnable containers should be shipped in accordance with supplier's recommendations. Return shipments should comply with all federal, state, and DOT regulations. All residual caustic soda should be removed from containers prior to disposal.

IX. ENVIRONMENTAL PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

Leaks should be stopped. Spills should be contained and cleaned up immediately. Spills should be removed by using a vacuum truck. Neutralize remaining traces of material with any dilute inorganic acid such as hydrochloric, sulfuric, nitric, phosphoric, and acetic acid. The spill area should then be flushed with water followed by liberal covering of sodium bicarbonate. All clean-up material should be removed and placed in approved containers, labeled and stored in a safe place to await proper treatment or disposal. Spills on areas other than pavement, e.g., dirt or sand, may be handled by removing the affected soils and placing in approved containers. Persons performing clean-up work should wear adequate personal protective equipment and clothing. Spills or releases should be reported, if required, to the appropriate local, state and federal regulatory agencies.

CAUTION: Caustic soda may react violently with acids and water.

WASTE DISPOSAL METHOD:

The materials resulting from clean-up operations may be hazardous wastes and, therefore, subject to specific regulations. Package, store, transport, and dispose of all clean-up materials and any contaminated equipment in accordance with all applicable federal, state, and local health and environmental regulations. Shipments of waste materials may be subject to manifesting requirements per applicable regulations. Appropriate disposal will depend on the nature of each waste material and should be performed by competent and properly permitted contractors. Ensure that all responsible federal, state, and local agencies receive proper notification of spill and disposal methods.

X. ADDITIONAL INFORMATION

OSHA Standard 29CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a hazard communication program including labeling, material safety data sheets, training and access to written records. We request that you, and it is your legal duty to, make all information in this Material Safety Data Sheet available to your employees.

To aid our customers in complying with regulatory requirements, SARA Title III hazard categories for this product are indicated in Section I. If the word "YES" appears next to any category, this product may be reportable by you under the requirements of 40 CFR Part 370. Please consult those regulations for details.

XI. PREPARATION INFORMATION

For additional Non-Emergency health, safety, or environmental information telephone (716) 286-3081, or write to:

Occidental Chemical Corporation
Product Stewardship Department
360 Rainbow Boulevard South
Niagara Falls, NY 14302

For Emergencies: 24 HOUR EMERGENCY PHONE: 1-800-733-3665

To request an MSDS: 716-286-3400

This Material Safety Data Sheet (MSDS) covers the following materials

- DIAPHRAGM 50%
- RAYON 18%
- DIAPHRAGM 73%
- PURIFIED 50%
- DIAPHRAGM 9%
- DIAPHRAGM 21%
- DIAPHRAGM 30%
- DIAPHRAGM 10%
- RAYON 15%
- RAYON 10%
- RAYON 30%
- DIAPHRAGM 20%
- DIAPHRAGM 45%
- MEMBRANE 30%
- DIAPHRAGM 24%
- 601W
- RAYON 25%
- SOLUTION 50%
- MEMBRANE 50%
- RAYON 50%
- DIAPHRAGM 19%
- DIAPHRAGM 25%
- DIAPHRAGM 18%
- DIAPHRAGM 15%
- RAYON 17%
- RAYON 14%
- RAYON 20%
- DIAPHRAGM 35%
- DIAPHRAGM 28%
- LIQUID
- 601

WARNING LABEL INFORMATION

SIGNAL WORD: DANGER

STATEMENT OF HAZARDS:

CAUSES SEVERE BURNS TO SKIN, EYES AND MUCOUS MEMBRANES.
CONTACT WITH EYES CAN CAUSE PERMANENT EYE DAMAGE.
INHALATION OF DUST, MIST, OR SPRAY CAN CAUSE SEVERE LUNG DAMAGE.
CAN REACT VIOLENTLY WITH WATER, ACIDS, AND OTHER SUBSTANCES.

PRECAUTIONARY STATEMENTS:

Do not get into eyes, on skin, on clothing.
Avoid breathing dust, mist, or spray.
Do not take internally.
Use with adequate ventilation and wear respiratory protection when exposure to dust, mist, or spray is possible.
When handling, wear chemical splash goggles, face shield, rubber gloves and protective clothing.
Wash thoroughly after handling or contact - exposure can cause burns which are not immediately painful or visible.
Keep container closed.
Product can react violently with water, acids, and other substances - read Handling and Storage instructions carefully before using.
Product is corrosive to tin, aluminum, zinc, and alloys containing these metals, and will react violently with these metals in powder form.
Hazardous carbon monoxide gas can form upon contact with food and beverage products in enclosed spaces and can cause death. Follow appropriate tank entry procedures.

FIRST AID:

FOR EYES:

OBJECT IS TO FLUSH MATERIAL OUT IMMEDIATELY THEN GET MEDICAL ATTENTION. IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes, holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

FOR SKIN:

IMMEDIATELY wash with plenty of water for at least 15 minutes. Remove contaminated clothing and footwear. Wash clothing before reuse and discard footwear which cannot be decontaminated. GET MEDICAL ATTENTION IMMEDIATELY.

IF INHALED:

Remove to fresh air. If breathing is difficult, have trained person administer oxygen. If respiration stops, give mouth-to-mouth resuscitation. GET MEDICAL ATTENTION.

IF SWALLOWED:

NEVER GIVE ANYTHING NY MOUTH TO AN UNCONSCIOUS PERSON. If swallowed, DO NOT INDUCE VOMITING . Give large quantities of water. If available, give several glasses of milk. If vomiting occurs spontaneously, keep airway clear. GET MEDICAL ATTENTION IMMEDIATELY.

IN CASE OF:
SPILL OR LEAK:

Leaks should be stopped. Spills, after containment, should be shoveled up or removed by vacuum truck (if liquid) to chemical waste area. Neutralize residue with dilute acid, flush spill area with water followed by liberal covering of sodium bicarbonate. Dispose of wash water and spill by-products according to federal, state, and local regulations.

WARNING LABEL INFORMATION (Continued)

HANDLING AND STORAGE:

Considerable heat is generated when product is mixed with water. Therefore, when making solutions always carefully follow these steps:

ALWAYS wear ALL prescribed protective clothing. NEVER add water to product. ALWAYS add product - with constant stirring - slowly to surface of lukewarm (80-100°F) water, to assure product is being completely dissolved as it is added.

If product is added too rapidly, or without stirring, and becomes concentrated at bottom of mixing vessel, excessive heat may be generated, resulting in DANGEROUS boiling and spattering, and a possible IMMEDIATE AND VIOLENT ERUPTION of highly caustic solution.

NOTE: Never add more product than can be absorbed by solution while maintaining temperature below 200°F (@ sea level) to prevent boiling and spattering.

Product can react EXPLOSIVELY with acids, aldehydes, and many other organic chemicals - when mixing product with solutions containing such chemicals, follow all of above mixing instructions, and add product very gradually, while stirring constantly.

ALWAYS empty and clean containers of all residues before adding product, to avoid possible EXPLOSIVE reaction between product and unknown residue.

Returnable containers should be shipped in accordance with supplier's recommendations. Return shipments should comply with all federal, state, and DOT regulations. All residual caustic soda should be removed from containers prior to disposal.

DISPOSAL:

The materials resulting from clean-up operations may be hazardous wastes and, therefore, subject to specific regulations. Package, store, transport, and dispose of all clean-up materials and any contaminated equipment in accordance with all applicable federal, state, and local health environmental regulations. Shipments of waste materials may be subject to manifesting requirements per applicable regulations. Appropriate disposal will depend on the nature of each waste material and should be performed by competent and properly permitted contractors. Ensure that all responsible federal, state, and local agencies receive proper notification of disposal.

INFORMATION REQUIRED BY FEDERAL, STATE OR LOCAL REGULATIONS:

This product contains:

CAS#	NAME
7732185	Water
1310732	Sodium hydroxide (Na(OH))
7647145	Sodium chloride (NaCl)
7775099	Chloric acid, sodium salt

HMIS RATING SYSTEM: HEALTH 3 FLAMMABILITY 0 REACTIVITY 2

FOR INDUSTRIAL USE ONLY **LABEL 113M32415**

MATERIAL SAFETY DATA SHEET

Koala Corporation
1320 Greenfield Avenue S.W.
Canton, Ohio 44706
(216) 452-5759

Emergency Contact: Sales Manager
or your local poison control center.

Date of last revision 1/1/94

All information below is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or other warranty, expressed or implied, with respect to such information, and we assume no liability resulting from its use or misuse. Users should make their own investigation to determine the suitability of the information for their particular purpose.

SECTION 1 - MATERIAL IDENTIFICATION

CHEMICAL NAME	ZINC	CAS NO. 7440-66-6
TRADE NAME/SYNONYMS	SPECIAL HIGH GRADE ZINC SHG ZINC BALL ANODES SHG ZINC BAR ANODES SHG ZINC SLABS	
CHEMICAL FAMILY	ELEMENTARY METAL	

CHEMICAL FAMILY	ELEMENTARY METAL
MOLECULAR FORMULA	Zn
MOLECULAR WEIGHT	65.38

SECTION 2 - INGREDIENTS & HAZARDS

MATERIAL OR COMPONENT:	ZINC METAL
WEIGHT %	99.99
P E L	NOT LISTED
T L V	NOT LISTED

SUPERFUND AMENDMENTS & RESTORATION ACT - TITLE III APPLICABILITY

Section 312 40CFR 370.4	PHYSICAL HAZARD ____ Fire ___ Release of Pressure ____ Reactivity	HEALTH HAZARD __X__ Acute __X__ Chronic
Section 313 40 CFR 372.85	ZINC COMPOUNDS	

This material or the components of this material are included in the Toxic Chemical Inventory as required in section 8(B) of the Toxic Substance Control Act (Public Law 94-469) & is codified in 40 CFR 720

SECTION 3 - PHYSICAL DATA

BOILING POINT:	No Data	EVAPORATION RATE:	No Data
VAPOR PRESSURE:	N/A	SPECIFIC GRAVITY:	7.13
VAPOR DENSITY:	N/A	MELTING POINT:	788 DEG. F
APPEARANCE & ODOR:	Bluish-White Metallic Shapes		

SECTION 4 - FIRE & EXPLOSION DATA

FLASH POINT:	N/A
UEL:	N/A
LEL:	N/A
AUTOIGNITION:	No Data
EXTINGUISHING MEDIA:	Class D Fire Extinguisher, dry sand, or vermiculite. Water may be ineffective as an extinguishing agent, but water spray or fog may be used as a cooling agent for closed containers.
SPECIAL FIRE FIGHTING CONSIDERATIONS:	See Section 5 for decomposition products. When dealing with known or unknown thermal decomposition products the use of Self-contained breathing apparatus (SCBA) and structural fire fighter's protective clothing will provide limited protection.

SECTION 5 - REACTIVITY DATA

Material is STABLE under normal temperatures and pressures.

THERMAL DECOMPOSITION:	May release toxic & hazardous fumes and oxides of Zinc.
HAZARDOUS POLYMERIZATION:	Has not been reported to occur under normal temperatures and pressures.
INCOMPATIBLE MATERIAL(S):	Zinc Oxide - Chlorinated Rubber.
CONDITIONS TO AVOID:	See incompatible materials.

SECTION 6 - SPILL, LEAK, AND DISPOSAL INFORMATION

Cleanup personnel need not use respiratory protection or other protective clothing in responding to spills of this material. Provide adequate ventilation. Confine the spill to as small an area as possible. Do not let material enter sewers or open watersheds. Use manual or mechanical means to pick up material. Place retrieved material in a clean, dry container and cover. Keep unnecessary people away. Isolate hazard area and deny entry.

Dispose of waste and unused material in accordance with Federal, State and Local disposal regulations. Consult appropriate regulatory officials for information on such disposal(s).

EPA HAZARDOUS WASTE NUMBER:	(40 CFR 261.33) N/A
EPA REPORTABLE QUANTITY:	(40 CFR 117.3) N/A
AQUATIC TOXICITY:	No Data

SECTION 7 - HEALTH HAZARD INFORMATION

ROUTES OF ENTRY:	Ingestion, inhalation
TARGET ORGAN(S):	(Zinc Oxide) Respiratory System
ACUTE EXPOSURE:	Skin Contact - Marked irritation Eye Contact - Marked irritation Ingestion - None known or anticipated Inhalation of Dust, Fume or Oxide - Metal fume fever (cough, fever, chills, headache, tight chest, nausea) sweet metal taste, dry throat. Lung damage/edema.
CHRONIC EXPOSURE:	Skin Contact - May cause dermatitis Eye Contact - May cause conjunctivitis Ingestion - None known or anticipated Inhalation of Zinc Oxide Fume - Low pulmonary functioning, dyspnea, rales, fatigue, blurred vision, back pain.

LISTED AS A SUSPECTED OR CONFIRMED CARCINOGEN BY: No agency or review group.

FIRST AID:

Skin Contact - Remove contaminated clothing. Wash affected area(s) with soap or mild detergent and large amounts of water. Seek medical attention.

Eye Contact - Wash eyes with large amounts of water (15 minute minimum) seek medical attention.

Ingestion - If victim is conscious induce vomiting. Seek medical attention.

Inhalation - Remove victim to fresh air environment. If breathing is difficult administer oxygen. If breathing has stopped administer artificial respiration. Keep victim warm and calm. Seek medical attention.

SECTION 8 - PERSONAL PROTECTIVE EQUIPMENT

VENTILATION: Provide local exhaust or process enclosure ventilation to maintain exposure below OSHA guidelines (29 CFR 1910.1000 subpart z).

RESPIRATORS: If exposures cannot be maintained at or below established OSHA guidelines respiratory protection must be provided in accordance with 29 CFR 1910.134 requirements.

GENERAL GUIDE LINES

KNOWN CONCENTRATIONS <PEL with Oxygen levels >19.5% : No respirator required.

KNOWN CONCENTRATIONS >PEL <IDLH with Oxygen levels >19.5% : Air-purifying full facepiece respirator with high-efficient particulate filters.

UNKNOWN CONCENTRATIONS AND/OR >IDLH and/or Oxygen levels <19.5% : Self-contained breathing apparatus with full facepiece operated in pressure-demand or other positive pressure mode. Supplied-air respirator with full facepiece operated in pressure-demand or other positive pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.

SKIN PROTECTION : Wear appropriate protective clothing and chemical resistant gloves as needed to prevent skin contact. Consult manufacturer to determine appropriate type(s) of gloves or clothing for your given application. Clean contaminated clothing and protective equipment before reuse. Wash thoroughly after handling material.

EYE PROTECTION : Where there is a potential for eye contact, wear splash proof or dust proof goggles.

OTHER : As deemed necessary by in-house health & safety staff.

SECTION 9 - SPECIAL PRECAUTIONS AND COMMENTS

STORAGE : No special storage requirements needed.

TRANSPORTATION DATA :

49 CFR	Hazardous Material Description and shipping name	Hazard Class
172.101	Not listed	
172.102	Not listed	
ID Number:	N/A	
Guide Number:	N/A	
Label(s):	N/A	

Enthone-OMI, Inc.

a subsidiary of ASARCO

MATERIAL SAFETY DATA SHEET

ENTHONE

ENTHOBRITE® NCZ-966A

P.O. BOX 1900
NEW HAVEN, CT 06508

(203) 934-8611

24 HOUR EMERGENCY PHONE NUMBERS
CHEMTREC 800-424-9300

NON-EMERGENCY PHONE NUMBERS

ENTHONE	203-934-8611
UDYLITE	313-497-9100
SEL-REX	313-497-9100

PRODUCT CODE#: 4466
DATE ISSUED: 3/18/91
SUPERCEDES: 2/27/91
PREPARER: S.D. Koch

II. HAZARDOUS INGREDIENTS

COMPONENT	COMMON NAME	CAS NO.	OSHA-PEL	ACGIH-TLV	%
Water		7732-18-5	NI	NI	>65
Sodium chloride	Salt	7647-14-5	NI	NI	<10
Polymer(s) not known to be hazardous.			NI	NI	<30

III. PHYSICAL PROPERTIES

SPECIFIC GRAVITY (WATER =1)	1.149	BOILING POINT, °F	210
EVAP.RATE (BUTYL ACETATE=1)	NI	MELTING POINT, °F	32
VAPOR PRESSURE, mmHg	NI	SOLUBILITY IN WATER	complete
VAPOR DENSITY (AIR=1)	NI	APPEARANCE	clear amber liquid
pH (AS IS)	ca. 6.5	ODOR	pungent

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT, °F	None	FLAMMABLE LIMITS (AIR)	NA	LEL	NA	UEL

EXTINGUISHING MEDIA

[X] Not Combustible [X] Water fog or spray [ ] Carbon Dioxide [ ] Dry Chemical [ ] Alcohol Foam [X] Foam [ ] Sand or Earth

SPECIAL FIRE FIGHTING PROCEDURES

Wear NIOSH approved full protective clothing and self-contained breathing apparatus. Keep containers cool to prevent rupture and release of material.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Heating dried product may cause release of toxic oxides of nitrogen, also chlorine gas.

V. HEALTH HAZARD DATA

EFFECTS OF ACUTE EXPOSURE:

INHALATION: Mist or vapor may irritate respiratory tract.

INGESTION: Can cause severe irritation to mouth, throat, esophagus, and stomach.

SKIN: Can cause irritation.

EYES: Can cause severe irritation, damage to eyes.

EFFECTS OF CHRONIC EXPOSURE:

Repeated or prolonged exposure may cause severe irritation.

CARCINOGEN: Not listed by NTP, IARC, OSHA.

REFERENCE:

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove person from contaminated area. If breathing has stopped, resuscitate and administer oxygen if available.
Seek immediate medical attention.

INGESTION: Never give anything by mouth to an unconscious person, obtain immediate medical attention. If vomiting occurs spontaneously, keep airway clear. If swallowed DO NOT INDUCE VOMITING, give large amounts of water.
Seek immediate medical attention.

SKIN: Immediately wash contaminated skin with plenty of soap and water. Remove contaminated clothing and footwear. Wash clothing before reuse. Discard footwear. If irritation continues, seek medical attention.

EYES: Flush eyes with plenty of water, holding lids apart to ensure flushing of entire surface to prevent or relieve irritation.
If irritation persists, seek medical attention.

VI. PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL PROCEDURES:

Avoid contact with skin, eyes and clothing. Wear protective equipment (see Section VII). Do not breathe mist or vapors. Contain spill and soak up in suitable absorbent. Shovel into plastic lined steel containers. Dilute residual material with copious amounts of water and neutralize. Dispose of in accordance with Local, State and Federal regulations.

STORAGE AND HANDLING PRECAUTIONS:

Store in a cool dry place. Loosen cover cautiously when opening.

ADDITIONAL INFORMATION:

Store above freezing temperature.

VII. CONTROL MEASURES

VENTILATION: Local exhaust recommended.

RESPIRATOR: Use NIOSH approved respirator when air concentration is greater than the TLV or PEL. Use cartridge filter for acid mist.

EYE PROTECTION: [ ] Safety glasses [X] Chemical safety goggles [X] Face shield

PROTECTIVE GLOVES: [X] Neoprene [X] Natural rubber Other:

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:

Chemically resistant coveralls, hat, and shoes or boots.

WORK/HYGENIC PRACTICES:

Emergency eye wash and safety shower should be available. Wash thoroughly after handling.

ADDITIONAL INFORMATION:

For waste disposal of operating solutions consult Enthone-OMI Waste Disposal Procedures. For major spills consult Enthone-OMI for disposal assistance. Dispose of in accordance with Local, State, and Federal regulations.

CAS = Chemical Abstract Service
NI = No relevant information available
NA = Not applicable
Trade Secret = Claimed as allowed under 29 CFR 1910.1200
PEL = OSHA Permissible Exposure Limit
TLV = ACGIH Threshold Limit Value
NTP = National Toxicology Program
IARC = Int'l Agency for Research on Cancer

VIII. REACTIVITY DATA

X	Stable	CONDITIONS TO AVOID:	Stable under normal conditions. See incompatibility information.
	Unstable		

INCOMPATABILITY (Materials to avoid): Oxidizing agents

HAZARDOUS DECOMPOSITION PRODUCTS: Toxic gases including chlorine and oxides of carbon and nitrogen.

HAZARDOUS POLYMERIZATION		May occur	CONDITIONS TO AVOID: NA
	X	Will not occur	

IX. ADDITIONAL INFORMATION

This product does not contain any chemicals subject to the reporting requirements of SARA, TITLE III, Section 313 (40CFR372) or known to the State of California to cause cancer or birth defects (to comply with California Statute [Section 252249.6]).

Enthone-OMI Inc.

a subsidiary of ASARCO

MATERIAL SAFETY DATA SHEET

ENTHONE

ENTHOBRITE® NCZ-966B

P.O. BOX 1900
NEW HAVEN, CT 06508

(203) 934-8611

24 HOUR EMERGENCY PHONE NUMBERS
CHEMTREC 800-424-9300

NON-EMERGENCY PHONE NUMBERS

ENTHONE	203-934-8611
UDYLITE	313-497-9100
SEL-REX	313-497-9100

PRODUCT CODE#: 4467
DATE ISSUED: 5/14/92
SUPERCEDES: 11/21/89
PREPARER: B.A. Whalen/S.D. Koch

II. HAZARDOUS INGREDIENTS

COMPONENT	COMMON NAME	CAS NO.	OSHA-PEL	ACGIH-TLV	%
Water		7732-18-5	NI	NI	>90
Sodium bisulfite		7631-90-5	5mg/m3	5mg/m3	<5

III. PHYSICAL PROPERTIES

SPECIFIC GRAVITY (WATER =1)	1.054	BOILING POINT, °F	210
EVAP.RATE (BUTYL ACETATE=1)	NI	MELTING POINT, °F	30
VAPOR PRESSURE, mmHg	NI	SOLUBILITY IN WATER	complete
VAPOR DENSITY (AIR=1)	NI	APPEARANCE	pale yellow liquid
pH (AS IS)	ca. 6.5	ODOR	irritating

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT, °F	None	FLAMMABLE LIMITS (AIR)	NA	LEL	NA	UEL

EXTINGUISHING MEDIA

[X] Not Combustible [X] Water fog or spray [X] Carbon Dioxide [ ] Dry Chemical [ ] Alcohol Foam [X] Foam [ ] Sand or Earth

SPECIAL FIRE FIGHTING PROCEDURES

Wear NIOSH approved full protective clothing and self-contained breathing apparatus. Keep containers cool to prevent rupture and release of material.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Dried salts may release toxic oxides of sulfur above 300°F.

V. HEALTH HAZARD DATA

EFFECTS OF ACUTE EXPOSURE:

INHALATION: Mist or vapor may irritate respiratory tract.

INGESTION: Can cause irritation to mouth, throat, esophagus, and stomach.

SKIN: Can cause irritation.

EYES: Can cause severe irritation, damage to eyes.

EFFECTS OF CHRONIC EXPOSURE:

Chronic exposure effects not established.

CARCINOGEN: Not listed by NTP, IARC, OSHA.

REFERENCE:

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove person from contaminated area. If breathing has stopped, resuscitate and administer oxygen if available.
Seek immediate medical attention.

INGESTION: Never give anything by mouth to an unconscious person, obtain immediate medical attention. If vomiting occurs spontaneously, keep airway clear. If swallowed give large amounts of water and INDUCE VOMITING.
Seek immediate medical attention.

SKIN: Immediately wash contaminated skin with plenty of water for 15 minutes. Remove contaminated clothing and footwear. Wash clothing before reuse. Discard footwear if it cannot be decontaminated.
Seek immediate medical attention.

EYES: Flush eyes with plenty of water, holding lids apart to ensure flushing of entire surface to prevent or relieve irritation.
If irritation persists, seek medical attention.

VI. PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL PROCEDURES:
Avoid contact with skin, eyes, and clothing. Wear protective equipment (see Section VII). Do not breathe mist or vapors. Contain spill and soak up in suitable absorbent. Shovel up into plastic-lined steel containers and cover. Dispose of in accordance with Local, State, and Federal regulations.

STORAGE AND HANDLING PRECAUTIONS:
Store in a cool dry place. Loosen cover cautiously when opening.

ADDITIONAL INFORMATION:
Wash thoroughly after handling.

VII. CONTROL MEASURES

VENTILATION: Local exhaust recommended.

RESPIRATOR: Use NIOSH approved respirator when air concentration is greater than the TLV or PEL. Use cartridge filter for acid mist.

EYE PROTECTION: [ ] Safety glasses [X] Chemical safety goggles [X] Face shield

PROTECTIVE GLOVES: [X] Neoprene [X] Natural rubber Other:

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:
Chemically resistant coveralls, hat, and shoes or boots.

WORK/HYGENIC PRACTICES:
Emergency eye wash and safety shower should be available. Wash thoroughly after handling.

ADDITIONAL INFORMATION:
For waste disposal of operating solutions consult Enthone-OMI Waste Disposal Procedures. For major spills consult Enthone-OMI for disposal assistance. Dispose of in accordance with Local, State, and Federal regulations.

CAS = Chemical Abstract Service
NI = No relevant information available
NA = Not applicable
Trade Secret = Claimed as allowed under 29 CFR 1910.1200
PEL = OSHA Permissible Exposure Limit
TLV = ACGIH Threshold Limit Value
NTP = National Toxicology Program
IARC = Int'l Agency for Research on Cancer

VIII. REACTIVITY DATA

X	Stable	CONDITIONS TO AVOID:	Stable under normal conditions. See Incompatibility information.
	Unstable		

INCOMPATABILITY (Materials to avoid): Oxidizing Agents, Alkalis.

HAZARDOUS DECOMPOSITION PRODUCTS: In a fire, oxides of sulfur and carbon.

HAZARDOUS POLYMERIZATION		May occur	CONDITIONS TO AVOID: NA
	X	Will not occur	

IX. ADDITIONAL INFORMATION

This product does not contain any chemicals subject to the reporting requirements of SARA, TITLE III, Section 313 (40CFR372) or known to the State of California to cause cancer or birth defects (to comply with California Statute [Section 25249.6]).

Enthone-OMI, Inc.

a subsidiary of ASARCO

MATERIAL SAFETY DATA SHEET

ENTHONE

ENTHOBRITE® NCZ-966C

P.O. BOX 1900
NEW HAVEN, CT 06508

(203) 934-8611

24 HOUR EMERGENCY PHONE NUMBERS
CHEMTREC 800-424-9300

NON-EMERGENCY PHONE NUMBERS

ENTHONE	203-934-8611
UDYLITE	313-497-9100
SEL-REX	313-497-9100

PRODUCT CODE#: 4468
DATE ISSUED: 9/4/91
SUPERCEDES: 11/21/89
PREPARER: S.D. Koch

SDK

II. HAZARDOUS INGREDIENTS

COMPONENT	COMMON NAME	CAS NO.	OSHA-PEL	ACGIH-TLV	%
Water		7732-18-5	NI	NI	>95
2,3-Dihydro-2-thioxo-4(1H)-pyrimidinone	Thiouracil	141-90-2	NI	NI	<1

III. PHYSICAL PROPERTIES

SPECIFIC GRAVITY (WATER =1)	1.002	BOILING POINT, °F	212
EVAP.RATE (BUTYL ACETATE=1)	NI	MELTING POINT, °F	32
VAPOR PRESSURE, mmHg	NI	SOLUBILITY IN WATER	complete
VAPOR DENSITY (AIR=1)	NI	APPEARANCE	clear pale green liquid
pH (AS IS)	12.9	ODOR	none

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT, °F	None	FLAMMABLE LIMITS (AIR)	NA	LEL	NA	UEL

EXTINGUISHING MEDIA

[ ] Not Combustible [X] Water fog or spray [X] Carbon Dioxide [ ] Dry Chemical [ ] Alcohol Foam [X] Foam [ ] Sand or Earth

SPECIAL FIRE FIGHTING PROCEDURES

Wear NIOSH approved full protective clothing and self-contained breathing apparatus. Keep containers cool to prevent rupture and release of material.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Heating dried salts to decomposition temperatures may release toxic gases of sulfur and nitrogen oxides.

V. HEALTH HAZARD DATA

EFFECTS OF ACUTE EXPOSURE:

INHALATION: Mist or vapor may damage upper respiratory tract and lung tissue which may cause chemical pneumonia depending upon severity of exposure.

INGESTION: Can cause burns to mouth, throat, esophagus, and stomach.

SKIN: Can cause burns.

EYES: Causes severe burns with damage to eyes and possible blindness.

EFFECTS OF CHRONIC EXPOSURE:

Superficial destruction of skin or primary irritant dermatitis. Inhalation of mist or vapor may result in irritation or damage to respiratory tract tissue and increased susceptibility to respiratory illness.

CARCINOGEN: Thiouracil: animal limited evidence, human no adequate data.

REFERENCE: IMEMDT 7,85,74.

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove person from contaminated area. If breathing has stopped, resuscitate and administer oxygen if available.
Seek immediate medical attention.

INGESTION: Never give anything by mouth to an unconscious person, obtain immediate medical attention. If vomiting occurs spontaneously, keep airway clear. If swallowed give large amounts of water and INDUCE VOMITING.
Seek immediate medical attention.

SKIN: Immediately wash contaminated skin with plenty of water for 15 minutes. Remove contaminated clothing and footwear. Wash clothing before reuse. Discard footwear if it cannot be decontaminated.
Seek immediate medical attention.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds of exposure is essential to minimize damage.
Seek immediate medical attention.

VI. PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL PROCEDURES:

Avoid contact with skin, eyes and clothing. Wear protective equipment (see Section VII). Do not breathe mist or vapors. Contain spill and soak up in suitable absorbent. Shovel into plastic lined steel containers. Dilute residual material with copious amounts of water and neutralize. Dispose of in accordance with Local, State and Federal regulations.

STORAGE AND HANDLING PRECAUTIONS:

Store in a cool, dry place. Keep away from acids and oxidizers. Loosen cover cautiously when opening.

ADDITIONAL INFORMATION:

Store above freezing temperature.

VII. CONTROL MEASURES

VENTILATION: Local exhaust recommended.

RESPIRATOR: Use NIOSH approved respirator when air concentration is greater than the TLV or PEL. Use cartridge filter for alkaline mist.

EYE PROTECTION: [ ] Safety glasses [X] Chemical safety goggles [X] Face shield

PROTECTIVE GLOVES: [X] Neoprene [X] Natural rubber Other:

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:

Chemically resistant coveralls, hat, and shoes or boots.

WORK/HYGENIC PRACTICES:

Emergency eye wash and safety shower should be available. Wash thoroughly after handling.

ADDITIONAL INFORMATION:

For waste disposal of operating solutions consult Enthone-OMI Waste Disposal Procedures. For major spills consult Enthone-OMI for disposal assistance. Dispose of in accordance with Local, State, and Federal regulations.

CAS = Chemical Abstract Service
NI = No relevant information available
NA = Not applicable
Trade Secret = Claimed as allowed under 29 CFR 1910.1200
PEL = OSHA Permissible Exposure Limit
TLV = ACGIH Threshold Limit Value
NTP = National Toxicology Program
IARC = Int'l Agency for Research on Cancer

VIII. REACTIVITY DATA

X	Stable	CONDITIONS TO AVOID: Stable under normal conditions. See Incompatibility information.
	Unstable	

INCOMPATABILITY (Materials to avoid): Acids, oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Toxic gases including oxides of carbon, sulfur and nitrogen

HAZARDOUS POLYMERIZATION		May occur	CONDITIONS TO AVOID: NA
	X	Will not occur	

IX. ADDITIONAL INFORMATION

This product does not contain any chemicals subject to the reporting requirements of SARA, TITLE III, Section 313 (40CFR372) or known to the State of California to cause cancer or birth defects (to comply with California Statute [Section 25249.6]).

Enthone-OMI, Inc.

a subsidiary of ASARCO

MATERIAL SAFETY DATA SHEET

ENTHONE

ENTHOBRITE® NCZ-4211

P.O. BOX 1900
NEW HAVEN, CT 06508

(203) 934-8611

24 HOUR EMERGENCY PHONE NUMBERS
CHEMTREC 800-424-9300

NON-EMERGENCY PHONE NUMBERS
ENTHONE 203-934-8611
UDYLITE 313-497-9100
SEL-REX 313-497-9100

PRODUCT CODE#: 4456
DATE ISSUED: 11/19/87
SUPERCEDES: 1/84
PREPARER: F.R. Hirtler

II. HAZARDOUS INGREDIENTS

COMPONENT	COMMON NAME	CAS NO.	OSHA-PEL	ACGIH-TLV	%
Sodium metasilicate pentahydrate		6834-92-0	NI	NI	>90

III. PHYSICAL PROPERTIES

SPECIFIC GRAVITY (WATER =1)	NI	BOILING POINT, °F	NA
EVAP.RATE (BUTYL ACETATE=1)	NA	MELTING POINT, °F	NI
VAPOR PRESSURE, mmHg	NA	SOLUBILITY IN WATER	appreciable
VAPOR DENSITY (AIR=1)	NA	APPEARANCE	white powder
pH (AS IS)	NA	ODOR	none

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT, °F	None	FLAMMABLE LIMITS (AIR)	NA	LEL	NA	UEL

EXTINGUISHING MEDIA

[ ] Not Combustible [X] Water fog or spray [X] Carbon Dioxide [ ] Dry Chemical [ ] Alcohol Foam [ ] Foam [ ] Sand or Earth

SPECIAL FIRE FIGHTING PROCEDURES

Reaction with water may be highly exothermic.

UNUSUAL FIRE AND EXPLOSION HAZARDS

In the presence of water, material may react with amphoteric metals (such as aluminum, zinc, or tin) generating hydrogen gas which will burn or explode if ignited.

V. HEALTH HAZARD DATA

EFFECTS OF ACUTE EXPOSURE:

INHALATION: Dust may damage upper respiratory tract and lung tissue which may cause chemical pneumonia depending upon severity of exposure.

INGESTION: May be fatal. Causes burns to mouth, throat, esophagus and stomach.

SKIN: Can cause severe burns.

EYES: Causes severe burns with damage to eyes and possible blindness.

EFFECTS OF CHRONIC EXPOSURE:

None known.

CARCINOGEN: Not listed by NTP, IARC, OSHA

REFERENCE:

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove person from contaminated area. If breathing has stopped, resuscitate and administer oxygen if available.
Seek immediate medical attention.

INGESTION: Never give anything by mouth to an unconscious person, obtain immediate medical attention. If vomiting occurs spontaneously, keep airway clear. If swallowed DO NOT INDUCE VOMITING, give large amounts of water.
Seek immediate medical attention.

SKIN: Immediately wash contaminated skin with plenty of water for 15 minutes. Remove contaminated clothing and footwear. Wash clothing before reuse. Discard footwear if it cannot be decontaminated.
Seek immediate medical attention.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds of exposure is essential to minimize damage.
Seek immediate medical attention.

VI. PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL PROCEDURES:
Avoid contact with skin, eyes, and clothing. Wear protective equipment (See Section VII). Sweep or shovel spilled material into clean steel drum and cover. Flush spill area with copious amounts of water and neutralize residual traces. Dispose of in accordance with Local, State, and Federal regulations.

STORAGE AND HANDLING PRECAUTIONS:
Store in a cool, dry place. Keep away from acids and organic compounds. Loosen cover cautiously when opening.

ADDITIONAL INFORMATION:
Wash thoroughly after handling.

VII. CONTROL MEASURES

VENTILATION: Local exhaust recommended.

RESPIRATOR: Use NIOSH approved respirator when air concentration is greater than the TLV or PEL.
Use cartridge filter for dusts.

EYE PROTECTION: [ ] Safety glasses [X] Chemical safety goggles [X] Face shield

PROTECTIVE GLOVES: [X] Neoprene [X] Natural rubber Other:

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:
Chemically resistant coveralls, hat, and shoes or boots.

WORK/HYGENIC PRACTICES:
Emergency eye wash and safety shower should be available. Wash thoroughly after handling.

ADDITIONAL INFORMATION:
For waste disposal of operating solutions consult Enthone-OMI Waste Disposal Procedures. For major spills consult Enthone-OMI for disposal assistance. Dispose of in accordance with Local, State, and Federal regulations.

CAS = Chemical Abstract Service
NI = No relevant information available
NA = Not applicable
Trade Secret = Claimed as allowed under 29 CFR 1910.1200
PEL = OSHA Permissible Exposure Limit
TLV = ACGIH Threshold Limit Value
NTP = National Toxicology Program
IARC = Int'l Agency for Research on Cancer

VIII. REACTIVITY DATA

X	Stable	CONDITIONS TO AVOID:	Stable under normal conditions. See Incompatibility information.
	Unstable		

INCOMPATABILITY (Materials to avoid): Acids, organic compounds.

HAZARDOUS DECOMPOSITION PRODUCTS: None known.

HAZARDOUS POLYMERIZATION		May occur	CONDITIONS TO AVOID: NA
	X	Will not occur	

IX. ADDITIONAL INFORMATION

This Material Safety Data Sheet may be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Enthone-OMI, Inc. furnishes the data contained herein in good faith at customer's request without liability or legal responsibility for same whatsoever, and no warranty or guarantee, express or implied, is made with respect to such data; nor does Enthone-OMI, Inc. grant permission, recommendation, or inducement to infringe any patent whether owned by Enthone-OMI, Inc. or others. The data is offered solely for your information and consideration. Since conditions of use are beyond Enthone-OMI's control, user assumes all responsibility and risk.

Enthone-OMI, Inc.

a subsidiary of ASARCO

MATERIAL SAFETY DATA SHEET

ENTHONE

ENTHOBRITE® WAZ

P.O. BOX 1900
NEW HAVEN, CT 06508

(203) 934-8611

24 HOUR EMERGENCY PHONE NUMBERS
CHEMTREC 800-424-9300 (Transportation)
MFSA 313-644-5626
NON-EMERGENCY PHONE NUMBERS
ENTHONE 203-934-8611
UDYLITE 313-497-9100
SEL-REX 313-497-9100

PRODUCT CODE#: 4202
DATE ISSUED: 10/17/90
SUPERCEDES: 6/25/87
PREPARER: J.A. Zehnder/S.D. Koch

II. HAZARDOUS INGREDIENTS

COMPONENT	COMMON NAME	CAS NO.	OSHA-PEL	ACGIH-TLV	%
Alkylarylsulfonic acids, disodium salts		25167-32-2	NI*	NI*	<10
Water		7732-18-5	NI	NI	>90

*Recommended TWA: 5 mg/m3

III. PHYSICAL PROPERTIES

SPECIFIC GRAVITY (WATER =1)	1.026	BOILING POINT, °F	216
EVAP.RATE (BUTYL ACETATE=1)	NI	MELTING POINT, °F	32
VAPOR PRESSURE, mmHg	NI	SOLUBILITY IN WATER	complete
VAPOR DENSITY (AIR=1)	NI	APPEARANCE	pale yellow liquid
pH (AS IS)	9.1	ODOR	none

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT, °F	None	FLAMMABLE LIMITS (AIR)	NA	LEL	NA	UI

EXTINGUISHING MEDIA

[X] Not Combustible [X] Water fog or spray [X] Carbon Dioxide [ ] Dry Chemical [ ] Alcohol Foam [X] Foam [ ] Sand or Earth

SPECIAL FIRE FIGHTING PROCEDURES

In case of fire keep container cool in order to avoid rupture and spillage of material

UNUSUAL FIRE AND EXPLOSION HAZARDS

When exposed to high temperatures may generate toxic oxides of sulfur.

V. HEALTH HAZARD DATA

EFFECTS OF ACUTE EXPOSURE:

INHALATION: Mist or vapor may irritate respiratory tract.

INGESTION: Can cause irritation to mouth, throat, esophagus, and stomach.

SKIN: Can cause irritation.

EYES: Can cause severe irritation, damage to eyes.

EFFECTS OF CHRONIC EXPOSURE:

Chronic exposure effects not established.

CARCINOGEN: Not listed NTP, IARC, OSHA

REFERENCE:

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove person from contaminated area. If breathing has stopped, resuscitate and administer oxygen if available.
Seek immediate medical attention.

INGESTION: Never give anything by mouth to an unconscious person, obtain immediate medical attention. If vomiting occurs spontaneously, keep airway clear. If swallowed give large amounts of water and INDUCE VOMITING.
Seek immediate medical attention.

SKIN: Immediately wash contaminated skin with plenty of water for 15 minutes. Remove contaminated clothing and footwear. Wash clothing before reuse. Discard footwear if it cannot be decontaminated.
Seek immediate medical attention.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds of exposure is essential to minimize damage.
Seek immediate medical attention.

VIII. REACTIVITY DATA

X	Stable	CONDITIONS TO AVOID:	Stable under normal conditions. See Incompatibility information.
	Unstable		

INCOMPATABILITY (Materials to avoid): Acids

HAZARDOUS DECOMPOSITION PRODUCTS: Toxic carbon monoxide, carbon dioxide, oxides of sulfur.

HAZARDOUS POLYMERIZATION		May occur	CONDITIONS TO AVOID: NA
	X	Will not occur	

IX. ADDITIONAL INFORMATION

VI. PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL PROCEDURES:
Avoid contact with skin, eyes, and clothing. Wear protective equipment (see Section VII). Dispose of in accordance with Local, State, and Federal regulations.

STORAGE AND HANDLING PRECAUTIONS:
Store in a cool, dry place. Keep away from acids and oxidizers. Loosen cover cautiously when opening.

ADDITIONAL INFORMATION:
Wash thoroughly after handling.

VII. CONTROL MEASURES

VENTILATION: Local exhaust recommended.

RESPIRATOR: Use NIOSH approved respirator when air concentration is greater than the TLV or PEL.
Use cartridge filter for organic vapors.

EYE PROTECTION: [ ] Safety glasses [X] Chemical safety goggles [X] Face shield

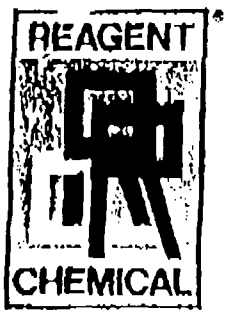
PROTECTIVE GLOVES: [X] Neoprene [X] Natural rubber Other:

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:
Chemically resistant coveralls, hat, and shoes or boots.

WORK/HYGENIC PRACTICES:
Emergency eye wash and safety shower should be available. Wash thoroughly after handling.

ADDITIONAL INFORMATION:
For waste disposal of operating solutions consult Enthone-OMI Waste Disposal Procedures. For major spills consult Enthone-OMI for disposal assistance. Dispose of in accordance with Local, State, and Federal regulations.

CAS = Chemical Abstract Service
NI = No relevant information available
NA = Not applicable
Trade Secret = Claimed as allowed under 29 CFR 1910.1200
PEL = OSHA Permissible Exposure Limit
TLV = ACGIH Threshold Limit Value
NTP = National Toxicology Program
IARC = Int'l Agency for Research on Cancer

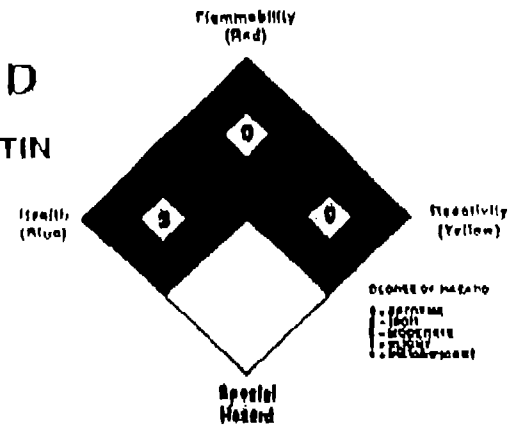


HYDROCHLORIC ACID

MATERIAL SAFETY DATA BULLETIN

(COMPLIANCE TO 29 CFR 1910, 1200g AMENDED)

REAGENT CHEMICAL
& RESEARCH INC.
124 River Road
Middlesex, New Jersey 08846



[redacted]

EMERGENCY PHONE
800-231-1607 - 24 HOUR
800-424-9300 - (CHEMTREC)

EMERGENCY RESPONSE GUIDEBOOK NUMBER
ID# 1789, Guide 60

PRODUCT NAME
Hydrochloric Acid, 20° or 22° Baumé

PRODUCT CAS NUMBER
7647-01-0

CHEMICAL FORMULA
HCl

TRADE NAME & SYNONYMS
Hydrochloric Acid - Muriatic Acid

TRANSPORTATION INFORMATION

Proper Shipping Name	- Hydrochloric Acid
Hazard Class	- Corrosive Liquid
UN/NA Identification	- UN1789
Hazard Class	- 8
Packaging Group	- II
IMM 101 Poison?	- NO
Reportable Quantity	- RQ 5000 lbs.
DOT Labels Required	- Corrosive
HMIS Labeling	- 3-0-0-X

SARA TITLE III ☑ Yes
Section 312 ☑ Yes Section 313 ☑ Yes

RCRA WASTE NUMBER
D002

CHEMICAL FAMILY
Inorganic Acid

HAZARDOUS INGREDIENTS

COMPONENTS	%	THRESHOLD LIMIT VALUE
Hydrogen Chloride	31.45 - 37.0	Ceiling-5.0 ppm

PHYSICAL DATA

APPEARANCE (Solid, Liquid, Gas) Liquid @ 20° C, 1 atm	**MOLECULAR WEIGHT** 36.5	**FREEZING TEMP.** -63° C; -63° F	**SPECIFIC GRAVITY** 1.1800 - 1.1994
VAPOR DENSITY (AIR =1) N.A.	**COLOR** Clear/Slightly Yellow	**BULK DENSITY** 9.671-9.806 lb/gal	**BOILING POINT** 110° C/230° F
VAPOR PRESSURE 60 - 80 mm Hg @ 20° C	**SOLUBILITY (Water)** Very Soluble	**ODOR** Sharp, Pungent, Irritant	**% VOLATILE BY VOL.** N.A.

FIRE & EXPLOSION DATA

FLASH POINT (Method Used)	FLAMMABLE LIMIT	EXTINGUISHING MEDIA
N.A.	Non-flammable	N.A.

SPECIAL FIRE FIGHTING PROCEDURES, UNUSUAL FIRE OR EXPLOSION HAZARDS

Non flammable, but Hydrochloric Acid reacts with all metals, except gold and platinum, with rapid evolution of Hydrogen which is flammable and explosive in air. Firefighters exposed to Hydrochloric Acid vapors should wear Scott Air-Pak or equivalent. Hydrogen Chloride vapors are extremely irritating to the respiratory tract and may cause breathing difficulty.

SPILL, DISCHARGE OR DISPOSAL

GENERAL

Spills or discharges into the environment involving large quantities of Hydrochloric Acid should be controlled and cleaned-up according to a pre-determined affirmative, written Spill Prevention and Control Program. For assistance in developing a SPCP contact your nearest Reagent Sales Office.

PERSONNEL

All personnel involved in a spill clean-up should follow the recommendations and practices set forth below (refer to Industrial Hygiene).

PROCEDURE

Spills should be handled immediately by neutralization and dilution of the spilled Product by the use of Soda Ash (Sodium Carbonate), Lime (Calcium Hydroxide) or Limestone (Calcium Carbonate) with large amounts of water. For an interior (inside a closed space) spill be aware that the use of Soda Ash, Lime and Limestone will evolve Carbon Dioxide and that ample ventilation be provided.

DISPOSAL

Under Federal RCRA, it is the responsibility of the user of Products to determine, at the time of disposal, whether the Product falls under the RCRA as a hazardous waste. This is because Product uses, transformations, syntheses, mixtures, etc. may render the resulting end-product hazardous.

INDUSTRIAL HYGIENE

EYE CONTACT

Chemical goggles and full face shields must be worn at all times by personnel exposed to or handling Hydrochloric Acid.

SKIN CONTACT

Impervious clothing, gloves, footwear and head gear must be worn at all times by Personnel exposed to or handling Hydrochloric Acid.

INHALATION

The use of a NIOSH approved full face piece cartridge respirator or a Scott Air Pak should be used by all personnel exposed to or handling Hydrochloric Acid.

RESPIRATOR SELECTION:

100 ppm concentration — chemical cartridge respirator with Acid gas cartridge with full face piece.

Escape — self contained breathing apparatus.

BIBLIOGRAPHY SOURCE REFERENCE

1. NIOSH-RTECS—Registry of Toxic Effects of Chemical Substances Volumes I-V — 1986.
2. American Conference of Governmental Industrial Hygienist — 1986.
3. Dangerous Properties of Industrial Material, SAX — Edition Six.
4. Handbook of Toxic and Hazardous Chemicals and Carcinogens, Second Edition, Marshall Sittig.
5. Industrial Hygiene and Toxicology, Patty — Volumes I-II ABC.

DISCLAIMER OF LIABILITY

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REVISED FEBRUARY 1994

CHEMICAL REACTIVITY

GENERAL

Hydrochloric Acid is chemically stable when properly contained and handled. It is a strong mineral acid and reacts with many metals and metal oxides and hydroxides to form the equivalent metal chloride. It reacts with zeolites and other silicious compounds to form Hydrosilicic Acid; it reacts with carbonates to form Carbon Dioxide and Water. It is oxidized by Oxygen or electrolysis to form Chlorine, a lethal, poisonous gas. It reacts with alkaline compounds to form a neutral salt. It is a hydrolyzing agent for carbohydrates, esters and other compounds.

The reaction of Hydrochloric Acid with most metals will produce Hydrogen, an explosive, flammable gas.

Violent reactions will result when Hydrochloric Acid reacts with acetic anhydride, 2-aminoethanol, ammonium hydoxide, calcium phosphide, chlorosulfonic acid, ethylene diamine, ethylene imine, oleum (fuming sulfuric acid), perchloric acid, beta propiolactone, propylene oxide, sodium hydoxide, sulfuric acid, uranium phosphide and vinyl acetate. This listing is not all-inclusive.

FIRST AID

GENERAL

If a known exposure occurs or is suspected, immediately initiate the recommended procedures below. Simultaneously contact a physician, the nearest hospital, or the nearest Poison Control Center. Inform the person contacted of the type and extent of exposure, describe the victim's symptoms and follow the advice given. For additional information, call, day or night, Reagent (800) 231-1807 or Chemtrec (800) 424-9300.

INGESTION

DO NOT induce vomiting. Immediately give large quantities of water or milk, if available. If vomiting does occur, give fluids again. Never give anything by mouth to an unconscious person. Call a physician or the nearest Poison Control Center immediately.

EYE CONTACT

Immediately flush the eyes with large quantities of running water for a minimum of 15 minutes. Hold the eyelids apart during the flushing to ensure rinsing of the entire surface of the eyes and lids with water. DO NOT attempt to neutralize with chemical agents. Obtain medical attention as soon as possible. Oils or ointments should not be used. Continue the flushing for an additional 15 minutes if the physician is not immediately available.

SKIN CONTACT

Immediately remove contaminated clothing under a safety shower. Flush all affected areas with large amounts of water for at least 15 minutes. DO NOT attempt to neutralize with chemical agents. Obtain medical advice immediately.

INHALATION

Remove from contaminated atmosphere. If breathing has ceased, clear the victim's airway and start mouth-to-mouth artificial respiration, which may be supplemented by the use of a bag-mask respirator, or a manually-triggered, oxygen supply capable of delivering 1 liter/second or more. If the victim is breathing, oxygen may be administered from a demand-type or continuous-flow inhalator, preferably with a physician's advice. Contact a physician immediately.

ADDITIONAL REGULATORY INFORMATON

TOXIC SUBSTANCES CONTROL ACT

This substance is listed on the Toxic Substances Control Act Inventory.

SUPERFUND AMENDMENT AND REAUTHORIZATION ACT, TITLE III

HAZARD CATAGORIES: HEALTH: Immediate (Acute) PHYSICAL: NONE
Delayed (Chronic)

EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW

Extremely Hazardous Substance - Threshold Planning Quantity: None Established

IS THIS PRODUCT REGULATED UNDER 1990 CLEAN AIR ACT? ☑ NO

DOES THIS PRODUCT CONTAIN, OR IS MANUFACTURED WITH, CFC's? ☑ NO

TOXICOLOGY

GENERAL

Hydrogen Chloride, both as a gas and in a solution as Hydrochloric Acid, is a corrosive substance and can cause severe and painful burns on contact with any part of the body or if taken internally. The mucous membranes of the eyes and the upper respiratory tract are especially susceptible to the irritating effects of high atmospheric concentrations of Hydrogen Chloride. The gas or vapor is so penetrating and pungent that when high concentrations do occur those exposed should immediately leave the contaminated area.

ROUTES OF ENTRY

Inhalation of the gas or mist; ingestion, eye and skin contact with both the gas and/or mist are possible routes of entry.

INGESTION

When concentrated Hydrochloric Acid is swallowed, it causes severe burns of the mucous membranes of the mouth, esophagus and stomach. The lips and mouth usually turn white, and later brown. There is pain in the throat and stomach, difficulty in swallowing, intense thirst, nausea and vomiting, followed by diarrhea and, in severe cases, by collapse and unconsciousness.

EYE CONTACT

Contact of the eyes with Hydrogen Chloride, either as a gas or in solution, rapidly causes severe irritation and painful burns of the eyes and eyelids. If the acid is not quickly removed by thorough irrigation with water, there may be prolonged or permanent visual impairment or total loss of sight. Wash the affected area for 15 minutes with large amounts of water.

SKIN CONTACT

Concentrated solutions are destructive to clothing and on contact with skin, cause severe burns unless promptly washed off. Repeated skin contact with dilute solutions may lead to the development of dermatitis. Exposure to the concentrated vapor of Anhydrous Hydrogen Chloride may also result in burns or dermatitis.

INHALATION

Inhalation of excessive concentrations of Hydrogen Chloride vapors immediately produces severe irritation of the upper respiratory tract, resulting in coughing, burning of the throat, and a choking sensation. Reactions encountered in man have usually been limited to inflammation and occasional ulceration of the nose, throat and larynx. If inhaled deeply, edema of the lungs may occur.

TOXICOLOGY DATA

(a) Toxicity:
Inhalation, human LCLo: 1300 ppm/30 min.
Oral, rabbit LD_{50}: 900 mg/Kg.

(b) Mutagenic Effects:
Chromosome damage, Inhalation: 100 ppm/24 hours
Chromosome damage, Oral: 100 ppm
Cytogenic effects, Parenteral: 20 mg

(c) OSHA Standard: Air: TLV 5 ppm
Air: TLV 7 mg/cubic meter

(d) ACGH Limit Values: Hydrogen Chloride TWA-STEL 5 ppm
TWA-STEL 7 mg./cu. meter

(e) TOSCA: Reported in TOSCA Inventory in 1980.
NOTE: The sources of the toxicology data are:
1. NIOSH-Registery of Toxic Effects of Chemical Substances 1988 Volumes I-V.
2. Patty-Industrial Hygiene and Toxicology Volume 2-A, B, C.
3. American Conference of Governmental Industrial Hygienists 1986.

The above quoted data are an abstract only of the complete information disclosed in the source documents. Reagent will supply, upon request, photos of the complete source documents referred to herein. Please phone the nearest Reagent Sales Office.

TOXICOLOGY DATA

CARCINOGENIC STATEMENT:

National Toxicology Register	☑ No	OSHA Register	☑ No
IARC Monograph	☑ No	ACGIH 1987-88	☑ No

STABILITY

GENERAL

Hydrochloric Acid is a stable compound and forms an azeotrope that boils at 108.6°C. or 227.5°F. at one atmosphere and contains 20.22% Hydrogen Chloride.

The gaseous form, Hydrogen Chloride, begins dissociation at 1500°C. or 2732°F.

Enthone-OMI Inc.

a subsidiary of ASARCO

MATERIAL SAFETY DATA SHEET

ENTHONE

ACTANE® 32

P.O. BOX 1900
NEW HAVEN, CT 06508

(203) 934-8611

24 HOUR EMERGENCY PHONE NUMBERS
CHEMTREC 800-424-9300

NON-EMERGENCY PHONE NUMBERS

ENTHONE	203-934-8611
UDYLITE	313-497-9100
SEL-REX	313-497-9100

PRODUCT CODE#: 2735
DATE ISSUED: 2/19/92
SUPERCEDES: 5/4/90
PREPARER: B.A. Whalen/S.D. Koch

SDK

II. HAZARDOUS INGREDIENTS

COMPONENT	COMMON NAME	CAS NO.	OSHA-PEL	ACGIH-TLV	%
Water		7732-18-5	NI	NI	>90
Butynediol-1,4		110-65-6	NI	NI	>1

III. PHYSICAL PROPERTIES

SPECIFIC GRAVITY (WATER =1)	1.014	BOILING POINT, °F	212
EVAP.RATE (BUTYL ACETATE=1)	NA	MELTING POINT, °F	NI
VAPOR PRESSURE, mmHg	NA	SOLUBILITY IN WATER	complete
VAPOR DENSITY (AIR=1)	NA	APPEARANCE	light yellow liquid
pH (AS IS)	7	ODOR	soap-like

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT, °F	NA	FLAMMABLE LIMITS (AIR)	NA	LEL	NA	UEL

EXTINGUISHING MEDIA

[X] Not Combustible [X] Water fog or spray [X] Carbon Dioxide [ ] Dry Chemical [ ] Alcohol Foam [X] Foam [ ] Sand or Earth

SPECIAL FIRE FIGHTING PROCEDURES

Wear NIOSH approved full protective clothing and self-contained breathing apparatus. Keep containers cool to prevent rupture and release of material.

UNUSUAL FIRE AND EXPLOSION HAZARDS

None known.

V. HEALTH HAZARD DATA

EFFECTS OF ACUTE EXPOSURE:

INHALATION: Mist or vapor may irritate respiratory tract.

INGESTION: Can cause irritation to mouth, throat, esophagus, and stomach.

SKIN: Can cause irritation.

EYES: Can cause severe irritation, damage to eyes.

EFFECTS OF CHRONIC EXPOSURE:

General discomfort, irritation and possible sensitization.

CARCINOGEN: Not listed by NTP, IARC, OSHA.

REFERENCE:

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove person from contaminated area. If breathing has stopped, resuscitate and administer oxygen if available.
Seek immediate medical attention.

INGESTION: Never give anything by mouth to an unconscious person, obtain immediate medical attention. If vomiting occurs spontaneously, keep airway clear. If swallowed give large amounts of water and INDUCE VOMITING.
Seek immediate medical attention.

SKIN: Immediately wash contaminated skin with plenty of water. Remove contaminated clothing and footwear. Wash clothing before reuse. Discard footwear if it cannot be decontaminated. If irritation continues, seek medical attention.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds of exposure is essential to minimize damage.
Seek immediate medical attention.

VI. PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL PROCEDURES:

Avoid contact with skin, eyes, and clothing. Wear protective equipment (see Section VII). Do not breathe mist or vapors. Contain spill and soak up in suitable absorbent. Shovel up into plastic-lined steel containers and cover. Dispose of in accordance with Local, State, and Federal regulations.

STORAGE AND HANDLING PRECAUTIONS:

Store in a cool, dry place. Keep away from acids and oxidizers. Loosen cover cautiously when opening.

ADDITIONAL INFORMATION:

Wash thoroughly after handling.

VII. CONTROL MEASURES

VENTILATION: Local exhaust recommended.

RESPIRATOR: Use NIOSH approved respirator when air concentration is greater than the TLV or PEL. Use cartridge filter for organic vapors.

EYE PROTECTION: [ ] Safety glasses [X] Chemical safety goggles [X] Face shield

PROTECTIVE GLOVES: [X] Neoprene [X] Natural rubber Other:

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:

Chemically resistant coveralls, hat, and shoes or boots.

WORK/HYGENIC PRACTICES:

Emergency eye wash and safety shower should be available. Wash thoroughly after handling.

ADDITIONAL INFORMATION:

For waste disposal of spilled or contaminated product follow Enthone-OMI Waste Disposal Procedures. If necessary, consult Enthone-OMI for disposal assistance. Dispose of in accordance with Local, State and Federal regulations.

CAS = Chemical Abstract Service
NI = No relevant information available
NA = Not applicable
Trade Secret = Claimed as allowed under 29 CFR 1910.1200
PEL = OSHA Permissible Exposure Limit
TLV = ACGIH Threshold Limit Value
NTP = National Toxicology Program
IARC = Int'l Agency for Research on Cancer

VIII. REACTIVITY DATA

X	Stable	CONDITIONS TO AVOID:	Stable under normal conditions. See Incompatibility information.
	Unstable		

INCOMPATABILITY (Materials to avoid): Oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS: Small amounts of carbon monoxide, carbon dioxide; traces of toxic oxides of sulfur.

HAZARDOUS POLYMERIZATION		May occur	CONDITIONS TO AVOID: NA
	X	Will not occur	

IX. ADDITIONAL INFORMATION

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, IL 60021-0005
Phone (708) 639-8910
Fax (708) 639-8911

24 Hr. Emergency No. - **CHEMTREC 1-800-424-9300**

SECTION I - PRODUCT INFORMATION

PRODUCT NAME: **KOBRA 520**

PRODUCT CLASS: Chromic Acid Solution

EFFECTIVE DATE: 03/08/94

MSDS # K0004 SUPERSEDES: N.A. First Issue PREPARED BY: MC

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	CAS #	WEIGHT	ACGIH TLV ppm (mg/m3)	OSHA PEL ppm mg/m3)
Chromic Acid	1333-82-0	LT 20%	0.05	0.1
Sodium Bichromate	7884-39-3	LT 20%	Not Established	
Nitric Acid	7697-37-2	LT 15%	5.0	5.0
Sulfuric Acid	7664-93-9	LT 10%	1.0	1.0

LEGEND: LT-Less Than N.A.-Not Applicable

SECTION III - HEALTH HAZARDS

CARCINOGENIC STATUS: Listed carcinogen (NTP, OSHA, IARC) NTP, Yes.

EXPOSURE LIMITS: Keep vapor concentrations below recommended permissible exposure levels, component TLV values.

ROUTES OF ENTRY: Eye and skin contact, ingestion, skin absorption and inhalation of mists or vapors.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P. O. Box 5
Fox River Grove, 60021-0005

PRODUCT NAME: **KOBRA 520**

SECTION III - HEALTH HAZARDS (con't)

ACUTE EFFECTS:	Corrosive to all body tissues. Eye and skin contact, inhalation, and ingestion can cause severe irritation and burns. Inhalation, ingestion, and skin absorption can cause burns and nausea. Contact may cause ulceration of skin or chrome sores.
CHRONIC EFFECTS:	Will cause severe irritation and possible permanent damage to the eyes. Prolonged or massive exposure may cause kidney failure and/or death.

EMERGENCY FIRST AID PROCEDURES

INGESTION:	Do not induce vomiting. Drink large amounts of water. Contact Physician for immediate medical attention.
EYE CONTACT:	Flush with water for at least 15 minutes. Contact Physician for immediate medical attention.
SKIN CONTACT:	Flush with plenty of water for at least 15 minutes. Remove contaminated clothing. Contact Physician for immediate medical attention. Wash clothing thoroughly before reuse.
INHALATION:	Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Contact Physician at once for medical attention.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, IL 60021-0005

PRODUCT NAME: **KOBRA 520**

SECTION IV - PHYSICAL DATA

APPEARANCE AND ODOR:	Red/Pungent Odor
% VOLATILE BY WEIGHT:	N.A.
EVAPORATION RATE:	N.A.
SPECIFIC GRAVITY:	1.22
VAPOR DENSITY (AIR=1):	Greater than 1
SOLUBILITY IN WATER:	Complete
BOILING POINT:	Greater than 212 Degree F
PH:	@ 5%, 1-3
VAPOR PRESSURE (mmHg):	N.A.

SECTION V - PHYSICAL HAZARDS

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:	N.A.
METHOD USED:	N.A.
FLAMMABLE LIMITS (% IN AIR):	N.A.
EXTINGUISHING MEDIA:	Carbon Dioxide, Water, Dry Chemical.
SPECIAL FIRE FIGHTING PROCEDURES:	Wear self contained breathing respirators apparatus.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	Heat and decomposition may produce hazardous vapor and foam. May generate explosive Hydrogen gas upon contact with most metals.

REACTIVITY DATA

STABILITY:	Stable under normal conditions.
CONDITIONS TO AVOID:	Avoid storage or contact with alkaline materials.
INCOMPATIBILITY:	Avoid materials which are easily oxidized, oils and organic materials.
DECOMPOSITION PRODUCTS:	Contact with Iron, Zinc, Aluminum, and other metals will generate explosive Hydrogen gas.
HAZARDOUS POLYMERIZATION:	Polymerization will not occur under normal storage and use conditions.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, IL 60021-0005

PRODUCT NAME: **KOBRA 520**

SECTION VI - SPILL, LEAK, AND DISPOSAL PROCEDURES

Contain small spills and leaks with inert material or absorbents. Place clean up material in container for approved disposal. Large spills may be contained by diked area with inert materials, earth, or clay. Remove all contaminated material for proper approved disposal. Notify proper authorities. Never flush to sewer.

WASTE DISPOSAL METHOD: Dispose of according to Federal, State and Local regulations.

SECTION VII - PRECAUTIONS FOR SAFE USE AND HANDLING

RESPIRATORY PROTECTION:	Use local or area mechanical room ventilation to reduce environmental concentrations to below permissible exposure levels. Respirators must be used when the permissible exposure levels may be exceeded. Use only MASHA/NIOSH approved air-purifying or supplied-air respirators.
SKIN PROTECTION:	Use industrial type rubber or plastic gloves, aprons, and boots as required to protect all areas of possible skin contact.
EYE PROTECTION:	Chemical goggles and full face shield should be worn.

SECTION VIII - SPECIAL PRECAUTIONS/ADDITIONAL INFORMATION

Store in tightly closed containers in a cool dry place away from alkaline and organic materials.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, IL 60021-0005

PRODUCT NAME: KOBRA 520

SECTION IX - TRANSPORTATION

DOT PROPER SHIPPING NAME:	Chromic Acid Solution N.O.S.
DOT HAZARD CLASSIFICATION:	Corrosive Material
DOT HAZARD IDENTIFICATION NUMBER:	NA1755

HMIS RATINGS: Health:3, Flammability:0, Reactivity:2, Personal Protection:J

SECTION X - REGULATORY INFORMATION

Disposal of the product, or residues and waste material from this product should be made in compliance with Federal, State, and Local environmental laws.

CERLA-SARA CLASSIFICATION: According to EPA hazard Categories of Section 311 and 312 of the Superfund Amendment and reauthorization Act of 1986 (SARA Title III) the following categories are as follows: IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD, REACTION HAZARD, FIRE HAZARD.

This product contains substances subject to the reporting requirements of SARA Section 313 of Title III and 40 CFR part 372.

This information is given without any warranty or representation. We do not assume any legal responsibility for same, nor do we give permission, inducement, or recommendation to practice any patented invention without a license. It is offered solely for your consideration, investigation, and verification. Before using any product, read its label.

COULTON CHEMICAL COMPANY
6600 SYLVANIA AVENUE
SYLVANIA, OHIO 43560-3997
(419) 885-4661 FAX (419) 882-8045

MATERIAL SAFETY DATA SHEET

PRODUCT: SULFURIC ACID, CONCENTRATED

DATE: JUNE 1, 1993 (Supersedes Issue of May 1, 1993)

SECTION 1: MATERIAL IDENTIFICATION

Chemical Name: Sulfuric Acid
Synonyms: Oil of Vitriol, Battery Acid, Hydrogen Sulfate
Chemical Formula: H_2SO_4
CAS Number: 7664-93-9
DOT Shipping Description: RQ, Sulfuric Acid, 8, UN 1830, PG II
DOT Hazard: Corrosive Material
Label: Corrosive

HMIS	
H:	3
F:	0
R:	2

NFPA

Manufacturer: Coulton Chemical Company
6600 Sylvania Avenue
Sylvania, Ohio 43560
Phone: 419-885-4661
Emergency 24 Hour Phone: 419-698-8181 or
CHEMTREC® 800-424-9300 day or night

SECTION 2: INGREDIENTS AND HAZARDS

Sulfuric Acid	93-99.5%
Water	7-0.5%

SECTION 2B: EXPOSURE STANDARDS

MSHA STD - AIR: TWA 1 mg/m³
OSHA PEL: 8H TWA 1 mg/m³
NIOSH IDLH: 80 mg/m³

SECTION 2C: TOXICITY DATA

Inhalation; human; TCL_o : 3mg/m³ /24W; Musculoskeletal (Changes in teeth and supporting structures.)
Oral; man; LDL_o : 135 mg/Kg: Details not reported.

SECTION 3: PHYSICAL DATA

	93.2% H_2SO_4	98.2% H_2SO_4
Boiling Point: 1 atm, °F	518	640
Specific Gravity: (60/60°F)	1.8357	1.84
Freezing Point: °F	-30	+37
Miscible with water		

Clear, Colorless, Oily Liquid
Non-Flammable

SECTION 4: FIRE AND EXPLOSION DATA

Sulfuric acid is nonflammable. However, dilute sulfuric acid will react with most metals to liberate hydrogen gas which can reach flammable or explosive limits if allowed to collect. Concentrated sulfuric acid will react with many organic materials and may cause fire due to the reaction heat. If water is added to concentrated acid a severe eruption may result, especially if the quantities involved are large.

SECTION 5: REACTIVITY DATA

Sulfuric acid does not polymerize. It is stable if stored properly. It is a mineral acid that will react strongly with bases and most organic materials. If sulfuric acid is diluted it will rapidly corrode most metals. Even normal corrosion by concentrated acid generates hydrogen gas which will slowly pressurize closed containers.

In use, sulfuric acid should always be diluted by adding acid slowly to water in order to control the heat generated by dilution. If water is added to strong acid, hazardous boiling and spattering may occur.

SECTION 6: HEALTH HAZARD INFORMATION

Sulfuric acid is not listed as a carcinogen by the NTP, IARC, OSHA. or ACGIH.

HEALTH HAZARDS: The International Agency for Research on Cancer (IARC) has classified "strong inorganic acid mists containing sulfuric acid" as a known human carcinogen (IARC Category 1). This classification applies only to mists containing sulfuric acid and not to sulfuric acid or sulfuric acid solutions. Debate continues in the scientific community as to whether or ot IARC adequately accounted for concomitant exposure to cigarette moking, alcohol consumption and known chemical carcinogens when it made this classification. Inhalation of sulfuric acid mists can also damage the respiratory tract and lungs. Concentrated sulfuric acid is a strong dehydrating agent that will quickly damage human tissue, especially if hot. Eye injuries can be severe and permanent.

FIRST AID: EYES. Immediately flush eyes with water for at least 15 minutes. Flush under lids by lifting them or rolling eyes. See a doctor as soon as possible. SKIN. Flush with water immediately and continue for at least 15 minutes. Remove clothing quickly in the safety shower and continue flushing. INHALATION. Seek fresh air and restore normal breathing. INGESTION. Drink large volumes of milk or water followed by milk of magnesia pending medical attention. Avoid vomiting if possible.

SECTION 7: SPILL, LEAK AND DISPOSAL PROCEDURES

Minor spills can be diluted with lots of water and neutralized with soda ash, lime or caustic. Containment provisions for major spills and subsequent handling should be predetermined to conform with applicable laws and regulations and to insure the safety of personnel involved. Contact your supplier if you need additional information. Disposal should follow all environmental regulations:

EPA RQ is 1000# (40 CFR 117)

EPA Hazardous Waste # is D002 (40 CFR 261.22)

(For waste that is corrosive or less than 2 pH)

Sulfuric Acid is included under SARA Title III Section 313 Reporting equirements. Refer to purchasing information for specific concentration.

SECTION 8: SPECIAL PROTECTION INFORMATION

Provide ventilation to control exposure levels below airborne exposure limits. Spray from leaks, adding water to spills, or agitation of acid may generate mist levels requiring breathing protection. If a respirator is needed, follow OSHA respirator regulations (29 CFR 1910.134) and wear a NIOSH/MSHA approved respirator. Seek professional advice prior to respirator selection and use. In emergencies or non-routine operations where exposure levels are unknown or high, wear a self-contained breathing apparatus with full face piece operated in the positive pressure mode.

Protect eyes with chemical safety goggles and include a full face shield when splashing may occur. Wearing of contact lenses is not recommended. Protect the skin with acid resistant protective clothing such as a suit, boots, hood and gloves.

A safety shower, eyewash fountain, or other source of clean running water should be readily accessible.

SECTION 9: SPECIAL PRECAUTIONS AND COMMENTS

Store sulfuric acid drums in shaded, well drained storage areas. Do not add water to large amounts of concentrated sulfuric acid. Do not allow dilute acid (less than 70%) to contact metals. Most metals are rapidly corroded in weak sulfuric acid and explosive hydrogen is generated.

SECTION 10: APPLICABLE REGULATIONS AND REFERENCES

OSHA 29 CFR 1910.1000	Vapor Exposure Limit
OSHA 29 CFR 1910.94	Ventilation
OSHA 29 CFR 1910.134	Respiratory Protection
OSHA 29 CFR 1910.20	Records Access
OSHA 29 CFR 1910.132	Personal Protection Equipment
OSHA 29 CFR 1910.151	Medical Services and First Aid
OSHA 29 CFR 1910.133	Eye and Face Protection
OSHA 29 CFR 1910.1200	Hazard Communication
SARA TITLE III - 40 CFR 355 App.A,B	RQ and TPQ
SARA TITLE III - 40 CFR 372	Annual Release Reporting
FWPLA 40 CFR 117	RQ
CERCLA 40 CFR 302.4	RQ

Sulfuric acid is listed in TSCA Inventory and meets criteria for OSHA medical records rule. This is not a comprehensive list of regulations affecting handling or use of sulfuric acid.

The information and recommendations in this Material Safety Data Sheet are based upon data believed to be correct. However, the information is necessarily general in nature, and each purchaser must decide how or if it fits in his particular situation. Coulton Chemical Company extends no warranties and assumes no responsibility as to the accuracy or suitability of this information or for consequences of its use.

PREPARED BY: Richard K. Hansen
Richard R. Hansen - Technical Manager

For further information contact:
COULTON CHEMICAL COMPANY
6600 Sylvania Avenue
Sylvania, Ohio 43560

PHONE: 419-885-4661
24 HOUR: 419-698-8181

VIGORO
INDUSTRIES, INC.

MATERIAL SAFETY DATA SHEET
NITRIC ACID
(VARIOUS CONCENTRATIONS)

TRANSPORTATION EMERGENCIES: Call (800) 424-9300 (CHEMTREC)

HEALTH EMERGENCIES: Contact your local poison control center. Read the entire product label if available.

PRECAUTIONARY INFORMATION SUMMARY: This product is highly corrosive to all body tissues. Inhalation of the vapors or fumes may result in serious injury or possibly death.

I. PRODUCT INFORMATION:

Product Name: Nitric Acid — **Formula:** HNO3

Chemical Name: Hydrogen Nitrate — **Chemical Family:** Inorganic Acid

CAS Number: 7697-37-2

Listed In: OSHA Subpart Z list- YES; ACGIH TLV List- YES; IARC Monographs- NO
NTP List- NO; None of the Above- NO

TYPICAL COMPOSITION	PER CENT	CAS NUMBER
Hydrogen Nitrate (HN03)	Varies by Concentration	7697-37-2
Water	Balance	7732-18-5

EXPOSURE STANDARD: The ACGIH Threshold Limit Value of 2 ppm or 5 mg/m3 for an eight-hour time weighed average apply. The OSHA limits are Time Weighted Average (TWA) of 2 ppm, Short Term Exposure Level (STEL) of 4 ppm and ceiling, none assigned.

II. PERSONAL PROTECTION INFORMATION

VENTILATION: Adequate ventilation to keep Nitric Acid fumes below applicable standards (OSHA - 2 ppm)

SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

EYE: Tight fitting, shielded/vented chemical goggles required. A full face shield may be worn over goggles for additional protection. Contact lenses should not be worn by people exposed to Nitric Acid.

SKIN: Neoprene or PVC gauntlet-type gloves, apron, jackets or rain suits.

RESPIRATORY: If TLV of the product or any component is exceeded, a NIOSH/MSHA jointly approved air supplied respirator is advised in the absence of proper environmental controls. OSHA regulations also permit other NIOSH/MSHA respirators under specified conditions.

OTHER: Safety shower and eye wash fountain should be provided in the immediate area.

III. HEALTH INFORMATION

PHYSIOLOGICAL AND HEALTH EFFECTS

EYES: Causes severe damage and even blindness very rapidly.

SKIN: Will produce immediate burns with yellow skin discoloration, possibly deep ulceration.

INHALATION: Mist or fumes at 2 to 5 ppm over an eight-hour period may cause pulmonary irritation and symptoms of lung damage; greater than 200 ppm will cause severe pulmonary damage with possible fatal results after several minutes exposure (4-30 hours delay in onset).

INGESTION: Results in severe damage to mucous membranes (digestive tract) and deep tissues.

EMERGENCY AND FIRST AID PROCEDURES

EYES: Immediately wash eyes for 30 minutes MINIMUM with large amounts of water, holding eye lids open then see a physician.

SKIN: Immediately wash exposed area with large amounts of water for 20 minutes. Remove contaminated clothing. Move patient to fresh air and call a physician.

INHALATION: Move patient to fresh air. Call a physician and administer artificial respiration if patient is not breathing. Observe for 4-30 hours after inhalation for pulmonary edema.

INGESTION: Have conscious patient drink plenty of water or milk. DO NOT induce vomiting.

SYMPTOMS OF OVER EXPOSURE

ACUTE: Vapor or mist is an extreme irritant to eyes, nose, throat and skin. Liquid and high vapor concentrations may result in severe burns to the eyes and permanent damage. High concentrations of vapor may cause severe breathing difficulties which may be delayed in onset (up to 30 hours).

CHRONIC: Repeated or prolonged exposure to mist or vapors may cause erosion of the exposed areas creating a yellowing effect.

NOTES TO PHYSICIAN: Refer to "Symptoms of Over Exposure, Inhalation Emergency and First Aid Procedures."

IV. REACTIVITY DATA

STABILITY: Stable- YES Unstable-
CONDITIONS TO AVOID - Excessive heat causes decomposition to toxic nitrogen oxides; NO, N_2O, N_2O_3, NO_2 and N_2O_4.

INCOMPATIBILITY (Materials to Avoid): Reacts explosively with metallic powders, carbides, hydrogen sulfide and turpentine. Increases the flammability of combustible, organic and readily oxidizable materials; can cause ignition of some of these materials.

CONDITIONS TO AVOID- N/A

HAZARDOUS DECOMPOSITION PRODUCTS: Oxides of nitrogen (NO, NO_2).

HAZARDOUS POLYMERIZATION: Will Occur- Will Not Occur- X

V. PHYSICAL AND CHEMICAL PROPERTIES

	BOILING POINT	MELTING POINT	VAPOR DENSITY	EVAPORATION	pH
68-85%	245-252 F. 118-122 C.	- 4 to -30F. -20 to -34C.	1.3 (Air = 1) X Heavier than Air Lighter than Air	N/A (Butyl Acetate =1) Faster Than Butyl Slower	< 1
45-67%	245-252 F. 118-122 F.	- 4 to -30F. -20 to -34C.	1.3	N/A	< 1
20-44%	218-252 F. 103-113 C.	-0.5 to -22F. -1.75 to -30C.	1.3	N/A	< 1

	SPECIFIC GRAVITY	MOLECULAR WEIGHT	PERCENT VOLATILES (by volume)	VAPOR PRESSURE
68-85%	1.38-1.44 (Water =1) Yes-Heavier than water Lighter than water	63	100	7 mm Hg @ 68F.
45-67%	1.35-1.41	63	100	7 mm Hg @ 68F.
20-44%	1.118-1.246	63	100	7 mm Hg @ 68F.

APPEARANCE AND ODOR

Water white to slightly yellow liquid with characteristic NO_2 odor (acrid). Darkens to brownish color on aging or exposure to light.

VI. HANDLING AND STORAGE PRECAUTIONS

HANDLING AND STORAGE PRECAUTIONS: Store in tightly closed containers in a clean, cool, well-ventilated area away from organic chemicals, strong bases, metal powders, carbides, sulfides, and any readily oxidizable materials. Protect from direct sunlight. Handle only when properly protected.

VII. FIRE PROTECTION INFORMATION

NEPA FIRE HAZARD RATING	FLASHPOINT	FLAMMABLE LIMITS (by volume in Air)	LOWER EXPLOSIVE	UPPER EXPLOSIVE
Flammability- 0 Health Hazard- 3 Specific Hazard- Oxidizer Reactivity- 0	N/A	N/A	N/A	N/A

AUTOIGNITION TEMPERATURE

N/A

HAZARD KEY:
Least- 0 Slight- 1
Moderate-2 High- 3
Extreme- 4

EXTINGUISHING MEDIA: WATER FOG

SPECIAL FIRE FIGHTING PROCEDURES: Self-contained apparatus with full face piece and full body protective clothing required when NITRIC ACID is involved in the fire. Use fire fighting agent suitable to surrounding material. The acid itself burns with difficulty.

USUAL FIRE AND EXPLOSION HAZARDS: Noncombustible but dangerously reactive with many materials. Fire may produce poisonous or irritating gas, fumes or vapor. Exposed firefighters should wear MSHA/NIOSH approved self-contained breathing apparatus, with full mask and full protective equipment.

VIII. TRANSPORTATION REQUIREMENTS

DEPARTMENT OF TRANSPORTATION CLASSIFICATION: As of October 1993, the proper DOT classification will be CORROSIVE rather than OXIDIZER

PROPER D.O.T SHIPPING DESCRIPTION REQUIRES ONE OF THE FOLLOWING:

NITRIC ACID (Other than red fuming with more than 70% nitric acid)
HAZARD CLASS - 8
IDENTIFICATION NUMBER - UN 2031
PACKING GROUP - PG 1

NITRIC ACID (Other than red fuming with not more than 70% nitric acid)
HAZARD CLASS - 8
IDENTIFICATION NUMBER - UN 2031
PACKING GROUP - PG 11

EMERGENCY RESPONSE GUIDE: #44

NITRIC ACID - NOT MORE THAN 40%
INDENTIFICATION NUMBER - UN 1760

EMERGENCY RESPONSE GUIDE: #60

OTHER REQUIREMENTS: Shipping containers must meet DOT specifications for NITRIC ACID and carry the CORROSIVE labels.

IX. ENVIRONMENTAL PROTECTION (In the Event of a Spill or Release)

ENVIRONMENTAL IMPACT: Releases to streams may kill aquatic life and pose potentially severe environmental impact.

PRECAUTIONS IF MATERIAL IS RELEASED OR SPILLED:

SMALL SPILL: Cover the contaminated surface with sodium bicarbonate or a soda ash/slaked lime mixture (50-50). Mix and add water if necessary to form a slurry. Scoop up slurry and wash site with soda ash solution.

LARGE SPILL: Eliminate all ignition sources (flares, flames including pilot lights, electrical sparks). Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed. Stop spill at source, dike area of spill to prevent spreading, pump liquid to salvage tank. Remaining liquid may be taken up on sand, earth, clay, or inorganic floor absorbent and shoveled into containers.

NEUTRALIZING CHEMICALS: Sodium Bicarbonate or Soda Ash/Slaked Lime (50-50).

WASTE DISPOSAL METHODS: If uncontaminated, recover and reuse as product. Consult state or federal environmental regulatory agencies for acceptable disposal procedures and disposal locations. Disposal in streams or sewers is contrary to regulations. If contaminated with other materials, the nature and extent of contamination may require use of special disposal methods.

REPORTABLE QUANTITIES: 1000 lbs.

"This product contains
NITRIC ACID *

---

which is a chemical regulated under Section 313 of S.A.R.A. Title III."
***(refer to prod. specs. for exact %)**

DISCLAIMER

VIGORO INDUSTRIES believes that the information contained in this MATERIAL SAFETY DATA SHEET is accurate as of the date indicated. VIGORO, however, makes no warranty, expressed or implied, as to either the accuracy of the information or the properties, fitness or safety of the chemical identified in Part I, and assumes no liability or responsibility in connection with the information contained herein or as a result of the use of this MATERIAL SAFETY DATA SHEET. This MATERIAL SAFETY DATA SHEET applies only to the chemical described and may not be valid if the chemical is altered, combined with another substance, or subjected to physical or chemical processes. Each company or person using or distributing this MATERIAL SAFETY DATA SHEET is responsible for insuring its accuracy, applicability and suitability at the time and under the particular circumstances of use or distribution.

6/30/92

MATERIAL SAFETY DATA SHEET

Product Name: K-1340EP

SECTION I - PRODUCT IDENTIFICATION

Manufacturer: Chem-Lube Corporation
8010 E. 88th St.
Indianapolis, Indiana 46256

Telephone:

Emergency Telephone Number
CHEMTREC 1-800-424-9300
Telephone Number for Information
317-849-4476

Date of preparation: 8/27/90

SECTION II - HAZARDOUS INGREDIENTS

Ingredients:	ACGIH TLV	% (w/w)
None		

SECTION III - PHYSICAL DATA

Specific Gravity : 0.80
Boiling Point : NA
Vapor Pressure: NA
Vapor Density : NA
Evaporation Rate : NA
Solubility in Water : complete
Appearance : white powder
Odor : none to slight

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point (Deg. F.) : NA
Lower Explosive Limit : NA
Upper Explosive Limit : NA
Extinguishing Media : NA
Special Fire Fighting Procedures : None
Unusual Fire/Explosion Hazards : None

SECTION V - REACTIVITY DATA

Chemical Stability : Stable
Conditions to Avoid : Extremely high temperatures
Incompatible Materials : None
Hazardous Decomposition Products : None
Hazardous Polymerization : will not occur

SECTION VI - HEALTH HAZARD DATA

Effects of Overexposure :

Eyes - Contact can cause irritation, redness, severe or permanent damage.

Skin - Prolonged or repeated contact can cause irritation.

Breathing - Mist may irritate nasal and respiratory passages.

First Aid Procedures :

Eyes - Flush from with water for 15 minutes. Get medical help if irritation persists.

Respiratory System : Remove to fresh air. If necessary, give oxygen, artificial respiration.

Ingestion : Give large quantities of water. Get medical assistance.

Carcinogenicity : Not listed as carcinogenic by IARC, NTP, OSHA, ACGIH.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be taken in case of spill : Absorb on inert absorbent or wash down with water.

Waste Disposal Method : Dispose in accordance with all local, state and federal regulations.

Precautions to be Taken in Handling and Storing : Store at moderate temperatures. Keep container closed when not in use.

Other Precautions : Keep out of the reach of children. Return empty drums to a licensed reconditioning service.

SECTION VIII - SPECIAL PROTECTION INFORMATION

Respiratory Protection : Use NIOSH approved respirator for product mists.

Ventilation : Recommended

Protective Gloves : Recommended for prolonged or repeated contact.

Eye Protection : Wear safety glasses or face shield.

Other Protective Clothing or Equipment : Eye wash station.

SECTION IX - NFPA AND HMIS RATINGS

Health: 1 Fire: 0 Reactivity : 0

Material Safety Data Sheet

Required under USDL Safety and Health Regulations for Shipyard Employment (29 CFR 1915)

U.S. Department of Labor
Occupational Safety and Health Administration

OMB No. 1218-0074
Expiration Date 05/31/86

11/8/85

Section I

Manufacturer's Name: Chem-Lube Corporation

Emergency Telephone Number: 317/849-4476

Address (Number, Street, City, State, and ZIP Code): 8010 E. 88th St. Indianapolis, IN 46256

Chemical Name and Synonyms: Acrylamide/Acrylic Acid Copolymer

Trade Name and Synonyms: K-1526AM

Chemical Family: Anionic Polyacrylamide

Formula: Proprietary

Section II - Hazardous Ingredients

Paints, Preservatives, and Solvents	%	TLV (Units)	Alloys and Metallic Coatings	%	TLV (Units)
Pigments			Base Metal		
Catalyst			Alloys		
Vehicle			Metallic Coatings		
Solvents			Filler Metal Plus Coating or Core Flux		
Additives			Others		
Others					

Hazardous Mixtures of Other Liquids, Solids or Gases

	%	TLV (Units)
Acrylamide Monomer	0.2	
Petroleum Distillate		

Section III - Physical Data

Boiling Point (°F)	212°	Specific Gravity (H_2O=1)	1.00-1.03
Vapor Pressure (mm Hg.)	NA	Percent Volatile by Volume (%)	Nil at 70°F.
Vapor Density (AIR=1)	NA	Evaporation Rate _____=1)	NA

Solubility in Water: NA

Appearance and Odor: milky white liquid; slight hydrocarbon odor

Section IV - Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	Lel	Uel
140°F. Setaflash			

Extinguishing Media: foam, dry chemical, carbon dioxide

Special Fire Fighting Procedures: Use air supplied rescue equipment for enclosed areas--cool exposed containers with water.

Unusual Fire and Explosion Hazards:

Form OSHA-20 (Rev 3/84)

Section V - Health Hazard Data

Threshold Limit Value
Toxicity comparable to mineral spirits.

Effects of Overexposure
This product contains some materials which have some potential for skin and eye damage. Inhalation of high concentrations may result in mild depression and nausea.

Emergency First Aid Procedures
Remove contaminated clothing and wash skin. Flush eyes with plenty of water and call a physician. If overcome by vapor, remove from exposure immediately.

Section VI - Reactivity Data

Stability	Unstable		Conditions to Avoid: high temperature
	Stable	X	

Incompatability (Materials to Avoid)
May dissolve some plastics and rubber.

Hazardous Decomposition Products

Hazardous Polymerization	May Occur		Conditions to Avoid: None
	Will Not Occur	X	

Section VII - Spill or Leak Procedures

Steps to be Taken in Case Material is Released or Spilled
Remove all ignition sources. Keep people away. Recover free liquid, and absorbant to spill area. Avoid breathing vapors. Ventilate enclosed spaces.

Waste Disposal Method
Absorb with dry solids (e.g., with sweeping compound) and incinerate.

Section VIII - Special Protection Information

Respiratory Protection (Specify Type)
NIOSH approved organic vapor respirators are required when ventilation is inadequate.

Ventilation	Local Exhaust	Special	
	Mechanical (General)	Other	

Protective Gloves: rubber or vinyl	Eye Protection: safety goggles and eye wash solution

Other Protective Equipment

Section IX - Special Precautions

Precautions to be Taken in Handling and Storing
Keep containers closed. Keep away from heat and open flames. Use only with adequate ventilation. Avoid prolonged or repeated breathing of vapors or contact wiht the skin.

Other Precautions

General Chemical

PRODUCT SAFETY DATA SHEET

SODIUM METABISULFITE

A. GENERAL INFORMATION

TRADE NAME (COMMON NAME)	[X] C.A.S. No	[ ] GENERAL PRODUCT CODE #
SODIUM METABISULFITE (anhydrous sodium bisulfite, ABS, sodium pyrosulfite)	7681-57-4	

CHEMICAL NAME AND/OR SYNONYM

Sodium Metabisulfite

FORMULA	MOLECULAR WEIGHT
$Na_2S_2O_5$	190.11

ADDRESS (No., STREET, CITY, STATE AND ZIP CODE)

General Chemical Corporation
90 E. Halsey Road
Parsippany, NJ 07054-0389

CONTACT	PHONE NUMBER	LAST ISSUE DATE	CURRENT ISSUE DATE
Manager, Product Safety	(201) 515-1840	May, 1988	May, 1992

B. FIRST AID MEASURES

EMERGENCY PHONE NUMBER
(800) 631-8050

EYES: Immediately flush with plenty of water, for at least 15 minutes. **Get medical attention.**

SKIN: Immediately wash with plenty of soap and water. Remove contaminated clothing and wash before reuse.

INHALATION: Remove to fresh air. **Get immediate medical attention** if signs of suffocation, irritation or other symptoms develop.

INGESTION: Give plenty of water or milk to drink. If conscious, induce vomiting by touching finger to back of throat. **Get immediate medical attention.** Never give anything by mouth to an unconscious person.

C. HAZARDS INFORMATION

HEALTH

INHALATION

Contact with acids, water and/or ice, releases sulfur dioxide gas which may be harmful or deadly if inhaled. May cause severe or deadly allergic reactions in some asthmatics and sulfite sensitive individuals. Inhalation of dust or mist can irritate the respiratory tract. Possible signs and symptoms of allergic reactions include bronchoconstriction, sweating, flushing, hives, rapid heart rate, decreased blood pressure and anaphylaxis.

INGESTION

May irritate gastrointestinal tract. Very large doses cause death, violent colic, diarrhea and depression.
Reference (b). May cause severe or deadly allergic reaction in some asthmatics and sulfite sensitive individuals.

SKIN

Repeated or prolonged contact with dust may cause irritation.
Contact with solution will irritate. See pH, Section F.

EYES

Dust or mist may irritate or burn eyes. Solutions will irritate or burn. See pH, Section F.

PERMISSIBLE CONCENTRATION: AIR (SEE SECTION J)	BIOLOGICAL
ACGIH/TLV: 5 mg/M³ OSHA/TWA: 5 mg/M³	None established.

UNUSUAL CHRONIC TOXICITY

Medical conditions aggravated by exposure: May cause severe or deadly allergic reactions if inhaled or in some asthmatics and sulfite sensitive individuals. See hazard information for inhalation and ingestion.

C. HAZARDS (Cont.)

FIRE AND EXPLOSION

FLASH POINT °C	AUTO IGNITION TEMPERATURE °C	FLAMMABLE LIMITS IN AIR (% BY VOL.)
Not Flammable ☐ OPEN CUP ☐ CLOSED CUP	Not applicable	LOWER — Not applicable UPPER — Not applicable

UNUSUAL FIRE AND EXPLOSION HAZARDS

See Hazardous Decomposition Products, Section G.

D. PRECAUTIONS PROCEDURES

FIRE EXTINGUISHING AGENTS RECOMMENDED

Not applicable.

FIRE ESTINGUISHING AGENTS TO AVOID

Not applicable.

SPECIAL FIRE FIGHTING PRECAUTIONS

Wear NIOSH-approved self-contained breathing apparatus.

VENTILATION

Local exhaust if dusty or misty condition prevails. The TLV may be exceeded without visual warning. Do not use in unventilated spaces, e.g., the holds of fishing boats, walk in coolers or confined spaces.

NORMAL HANDLING

Avoid contact with skin, eyes, clothing. Avoid breathing dust or mist. Use normal personal hygiene and housekeeping. Keep away from water, ice, acids, or heat.

STORAGE

Cool, dry, well ventilated space away from water, ice, acids and oxidizing agents. (Dry to avoid tendency of product to cake.) Releases sulfur dioxide gas slowly at ambient temperatures -- (see odor, Section F.)

SPILL OR LEAK (ALWAYS WEAR PERSONAL PROTECTIVE EQUIPMENT -- SECTION E)

Promptly sweep up with minimum dusting and shovel into an empty container and close. Cautiously spray residue with plenty of water. Provide ventilation to clear sulfur dioxide fumes which may be generated as a result of water contact. See Hazards Information (Section C) for information on the hazards of this product when mixed with water.

SPECIAL: PRECAUTIONS/PROCEDURES/LABEL INSTRUCTIONS

SIGNAL WORD - WARNING!

Avoid contact with water, ice, acid, and oxidizers. Use of this product in confined spaces may cause suffocation leading to death.

E. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION

Where required, use a NIOSH approved respirator for dust, mist, and/or sulfur dioxide gas, as conditions indicate. Some exposures may require NIOSH-approved self-contained breathing apparatus or supplied-air respirator.

EYES AND FACE

Wear hard hat (or other head covering) and chemical safety goggles. Do not wear contact lenses.

HANDS, ARMS, AND BODY

For handling dry material, wear cotton gloves and full work clothing, including long-sleeved shirt and trousers. When handling solutions and there is prolonged or repeated contact, wear impervious gloves, clothing and boots.

OTHER CLOTHING AND EQUIPMENT

Eye-wash/safety shower facility.

F. PHYSICAL DATA

MATERIAL IS (AT NORMAL CONDITIONS):	APPEARANCE AND ODOR	
☐ LIQUID ☒ SOLID ☐ GAS ☐ _____	Fine, white granular product. Pungent sulfur dioxide gas odor.	
BOILING POINT °C Decomposes above 150°C MELTING POINT °C	SPECIFIC GRAVITY (H₂O = 1) 1.48	VAPOR DENSITY (AIR = 1) Not applicable.
SOLUBILITY IN WATER (% by Weight) 39% at 16°C	pH 1% Solution, pH = 4.3 (approx.)	VAPOR PRESSURE (mm Hg at 20°C) ☐ (PSIG) ☐ Not applicable.
EVAPORATION RATE (Butyl Acetate = 1) ☐ (Ether = 1) ☐ Not applicable.	% VOLATILES BY VOLUME (At 20°C) Not applicable.	

G. REACTIVITY DATA

STABILITY	CONDITIONS TO AVOID
☐ UNSTABLE ☒ STABLE	Temperatures above 150°C cause evolution of toxic and corrosive gas (sulfur dioxide).

INCOMPATIBILITY (MATERIALS TO AVOID)

Oxidizers may cause strong exothermic reactions.
Acids, water and ice yield sulfur dioxide gas, which is toxic, corrosive, and potentially deadly.
Water and/or ice speeds the production of sulfur dioxide gas.

HAZARDOUS DECOMPOSITION PRODUCTS

Sulfur dioxide gas: see above comments.
Sodium sulfide residue: flammable, dangerous fire risk, strong irritant to skin and tissue, incompatible with acids.

HAZARDOUS POLYMERIZATION	CONDITIONS TO AVOID
☐ MAY OCCUR ☒ WILL NOT OCCUR	Not applicable.

H. HAZARDOUS INGREDIENTS (Mixtures Only)

MATERIAL OR COMPONENT / C A S #	WT. %	HAZARD DATA (SEE SECT. J)
Not Applicable		

* - PROPRIETARY — TRADE SECRET

I. ENVIRONMENTAL

DEGRADABILITY/AQUATIC TOXICITY	OCTANOL/WATER PARTITION COEFFICIENT
Aquatic Toxicity: 120 ppm/24, 48, & 96 hr/mosquito fish/TL_m/fresh water — Reference (b) (converting bisulfite figure to metabisulfite basis).	N.D.

EPA HAZARDOUS SUBSTANCES? (CLEAN WATER ACT SECT. 311)	[X] YES	[ ] NO	IF SO, REPORTABLE QUANTITY: 5000 # (As Sodium Bisulfite)	40 CFR 116 117

WASTE DISPOSAL METHODS (DISPOSER MUST COMPLY WITH FEDERAL, STATE AND LOCAL DISPOSAL OR DISCHARGE LAWS)

Neutralize with alkali and flush to sewer with plenty of water [see Hazards Information (Section C) for information on the hazards of this product when mixed with water] if permitted by applicable disposal regulations. Good ventilation is required during neutralization because of the release of SO_2 gas. Oxidation to sodium sulfite solution is required prior to disposal. This may be done by adding a slight excess of dilute hydrogen peroxide carefully and stirring. Neutralized or oxidized waste may have to be disposed of by an approved contractor.

RCRA STATUS OF UNUSED MATERIAL IF DISCARDED	HAZARDOUS WASTE NUMBER: (IF APPLICABLE)	40 CFR 261
Not a "hazardous waste".		

J. REFERENCES

PERMISSIBLE CONCENTRATION REFERENCES

(1) "Threshold Limit Values for Chemical Substances..." ACGIH, 1991-92.

REGULATORY STANDARDS	D.O.T. CLASSIFICATION: ORM-B	49 CFR 173

FDA regulations apply to use food and NF grades (21 CFR). Food use in meats or in food recognized as a source of vitamin B1 is prohibited (21 CFR 132.3766).

DOT ID NO.: NA 2693

GENERAL

(a) ACGIH, Documentation of the Threshold Limit Values, 4th ED., 1981, Am. Conf. of Governmental Industrial Hygienists, Cincinnati 45202 — a review for this material with 4 references.

(b) Coast Guard CHRIS system form covering Sodium Bisulfite and Metabisulfite, "SBS", October 1978.

K. ADDITIONAL INFORMATION

This product is not for food or drug use unless material is labeled "food grade" or "NF grade," as applicable.

For food grade product, the following applies;

(1) Effective August 8, 1987, the F.D.A. has banned the use of "Sulfiting Agents" or "Sulfites" on fruits and vegetables intended to be served raw or sold raw to consumers.

(2) Effective January 9, 1987, the F.D.A. is requiring when a sulfite is present in a detectable amount in a finished food, regardless of whether it has been directly or indirectly added via one or more of the food ingredients, it must be declared on the label. The regulation defines a "detectable amount" of sulfite to be 10 ppm.

(3) Sulfiting agents or sulfites are not to be used on foods or meats recognized as source of Vitamin B1.

PSDS FILE No. GC 3087

MIAMI PRODUCTS & CHEMICAL CO.
P.O. BOX 486 • DAYTON, OHIO 45401 • (513) 253-8927

SANYGEN LIQUID SHOCK

Material Safety Data Sheets

Miami Products and Chemical Co.
520 Lonoke St.
Dayton, OH 45401

For information please contact Miami Products and Chemical Co. at (513) 253-8927 or emergency number (800) 776-1313.

In the event of a transportation emergency call Chemtrec at (800) 424-9300.

Section I - Identification

TRADE NAME: Sanygen Liquid Shock, Sanygen Industrial Chlor, Water Polish
CHEMICAL NAME: Sodium Hypochlorite
FORMULA: NaOCL
DOT SHIPPING NAME: Hypochlorite Solution
DOT HAZARD CLASS: Corrosive Material
UN/NA NUMBER: UN 1791
DOT LABEL: Corrosive
DOT PLACARD: Corrosive
REPORTABLE QUANTITY: Sodium Hypochlorite: 100lbs/45kg
CAS NUMBER: 7681-52-9

NFPA DESIGNATION: The NFPA has not rated sodium hypochlorite.

Section II - Hazardous Ingredients

MATERIAL:	OSHA PEL	ACGIH TLV	% By Wt.
Sodium Hypochlorite	N/A	N/A	12.5
Sodium Hydrodixe	2mg/m3	2mg/m3	.1-.2%

*This substance is a chemical subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

Carcinogenicity Status: NTP - No, IARC - No, OSHA - No.

This complies to
U.S. Department of Labor
OSHA 174 MSDS - 13

SANYGEN LIQUID SHOCK

Material Safety Data Sheets

Section III - Physical Data

APPEARANCE: Yellow-green liquid
BOILING POINT: 219° F (104° C) for 12.5% NaOCL by wt.
FREEZING POINT: -11° F (-24° C) for 12.5% NaOCL by wt.
ODOR: Chlorine
pH: 12.5 - 13.5 s.u. @ 25° C
VISCOSITY (Cs): 2.15 @ 23° C for 12.5% NaOCL by wt.
PERCENT VOLATILE BY VOLUME: Variable water plus products of decomposition.
SOLUBILITY IN WATER: Complete
SPECIFIC GRAVITY (Water = 1): 1.21
VAPOR PRESSURE: (mm Hg): Variable water plus products
VAPOR DENSITY (AIR = 1): Not available

Section IV - Fire and Explosion Data

FLASH POINT: Not applicable
FLAMMABLE LIMITS: Not applicable
EXTINGUISHING MEDIA: Flood with water or carbon dioxode

SPECIAL FIRE FIGHTING PROCEDURES: Use OSHA approved (NIOSH) self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Material is a strong oxidizer. Contact with combustibles may promote combustion. Acid and heat decompose Hypochlorite with chlorine liberated.

Section V - Reactivity Data

STABILITY: Material is stable

INCOMPATIBILITY: Acids, Ammonia, Chlorinated Isocyanurates, Reducing Agents and Oxidizing Agents.

HAZARDOUS DECOMPOSITION OR BY PRODUCTS: Hydrochlorous Acid (HOCL) Chlorine, Hypochloric Acid. Additional decomposition products which depend upon pH, temperature and time, are sodium chloride sodium chlorate and oxygen.

HAZARDOUS POLYMERIZATION: Will not occur

This complies to
U.S. Department of Labor
OSHA 174 MSDS - 13

SAYGEN LIQUID SHOCK

Material Safety Data Sheet

Section VI Health Hazard Data

INHALATION: Fumes from spills are very irritating to mucous membranes.

SKIN CONTACT: Severe irritant, reddening of skin, skin damage.

EYE CONTACT: Severe irritant, CORROSIVE

INGESTION: Liquid contact can cause irritation of membranes of the mouth, throat and stomach pain and ulceration. LD_{50} (oral, rat) for 12.5% NaOCL is approximately 5 g/kg body weight.

EFFECT OF EXPOSURE: (Accute and Chronic)

Swallowing: Oral ingestion will cause stomach pain, nausea vomiting.

Skin Contact: Can cause reddening of skin and chemical. burns.

Eye Contact: Can cause severe irritant and damage.

Inhalation: Can be very irritating to mucous membranes.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

No known medical conditions are known to be aggravated by exposure.

EMERGENCY AND FIRST AID PROCEDURES:

Skin: Flush with water for 15 minutes. Get medical attention.

Eye: Immediately flush with water for 15 minutes. Get medical attention at once.

Inhalation: Remove to fresh air. Call a physician if exposure is severe.

Ingestion: Get medical attention immediately. DO NOT induce vomiting. Give large amounts of milk or gelatin solution, if not available, give large amounts of water to provide dilution.

This complies to
U.S. Department of Labor
OSHA 174 MSDS - 11

SANYGEN LIQUID SHOCK

Material Safety Data Sheets

Section VII - Precautions for Safe Handling and Use

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

Clean up: Personnel must wear proper protective equipment (see section VIII). Contain in dike area. Neutralize with sodium bisulfite or ferrous salt solutions. Flush area with large amounts of water. Comply with all Federal, State and local reporting requirements.

WASTE DISPOSAL

Comply with Federal, State and Local Environmental Regulators for guidance regarding proper disposal.

PRECAUTIONS TO BE TAKE IN HANDLING AND STORING

Wear goggles or face shield and rubber gloves when handling this product. Avoid breathing vapors. Store in a cool dry area away from direct sunlight. STORE IN UPRIGHT POSITION.

OTHER PRECAUTIONS

Strong oxidizing agent. Mix only with water according to label directions. Mixing this product with gross filth or with ammonia, acid, detergents or other chemicals may release hazardous gases.

Section VIII - Control Measures

VENTILATION REQUIREMENTS

Local exhaust is recommended. Sufficient to remove chlorine odor.

SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

Respirator: Use National Institute of Occupational Safety & Health (NIOSH) - MSHA approved TC-23C-865 respirator.

Eyes: Use chemical goggles and/or face shield.
Gloves: Use rubber gloves.
Other: Use rubber splash apron. Safety shower and eye wash fountain should be located nearby.

This complies to
U.S. Department of Labor
OSHA 174 MSDS - 13

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, IL 60021-0005
Phone (708) 639-8910
Fax (708) 639-8911

24 Hr. Emergency No. - **CHEMTREC 1-800-424-9300**

SECTION I - PRODUCT INFORMATION

PRODUCT NAME: **KOBRA 550-A**

PRODUCT CLASS: Chromic Acid Solution

EFFECTIVE DATE: 03/08/94

MSDS # K0001 SUPERSEDES: N.A. First Issue PREPARED BY: MC

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	CAS #	WEIGHT	ACGIH TLV ppm (mg/m3)	OSHA PEL ppm mg/m3)
Chromic Acid	1333-82-0	LT 25%	0.05	0.1
Sulfuric Acid	7664-93-9	LT 10%	1.00	1.0
Phosphoric Acid	7664-38-2	LT 10%	1.00	1.0

LEGEND: LT-Less Than N.A.- Not Applicable

SECTION III - HEALTH HAZARDS

CARCINOGENIC STATUS: Listed Carcinogen (NTP, OSHA, IARC) NTP, Yes.

EXPOSURE LIMITS: Keep vapor concentrations below recommended permissible exposure levels, component TLV values.

ROUTES OF ENTRY: Eye and skin contact, ingestion, skin absorption and inhalation of mists or vapors.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
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Fox River Grove, 60021-0005

PRODUCT NAME: **KOBRA 550-A**

SECTION III - HEALTH HAZARDS (con't)

ACUTE EFFECTS:	Corrosive to all body tissues. Eye and skin contact, inhalation, and ingestion can cause severe irritation and burns. Inhalation, ingestion, and skin absorption can cause burns and nausea. Contact may cause ulceration of skin or chrome sores.
CHRONIC EFFECTS:	Will cause severe irritation and possible permanent damage to the eyes. Prolonged or massive exposure may cause kidney failure and/or death.

EMERGENCY FIRST AID PROCEDURES

INGESTION:	Do not induce vomiting. Drink large amounts of water. Contact Physician for immediate medical attention.
EYE CONTACT:	Flush with water for at least 15 minutes. Contact Physician for immediate medical attention.
SKIN CONTACT:	Flush with plenty of water for at least 15 minutes. Remove contaminated clothing. Contact Physician for immediate medical attention. Wash clothing thoroughly before reuse.
INHALATION:	Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Contact Physician at once for medical attention.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, IL 60021-0005

PRODUCT NAME: **KOBRA 550-A**

SECTION IV - PHYSICAL DATA

APPEARANCE AND ODOR:	Red/Pungent Odor
% VOLATILE BY WEIGHT:	N.A.
EVAPORATION RATE:	N.A.
SPECIFIC GRAVITY:	1.22
VAPOR DENSITY (AIR=1):	Greater than 1
SOLUBILITY IN WATER:	Complete
BOILING POINT:	Greater than 212 Degree F
PH:	@ 5%, 1-3
VAPOR PRESSURE (mmHg):	N.A.

SECTION V - PHYSICAL HAZARDS

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:	N.A.
METHOD USED:	N.A.
FLAMMABLE LIMITS (% IN AIR):	N.A.
EXTINGUISHING MEDIA:	Carbon Dioxide, Water, Dry Chemical.
SPECIAL FIRE FIGHTING PROCEDURES:	Wear self contained breathing respirators apparatus.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	Heat and decomposition may produce hazardous vapor and foam. May generate explosive Hydrogen gas upon contact with most metals.

REACTIVITY DATA

STABILITY:	Stable under normal conditions.
CONDITIONS TO AVOID:	Avoid storage or contact with alkaline materials.
INCOMPATIBILITY:	Avoid materials which are easily oxidized, oils and organic materials.
DECOMPOSITION PRODUCTS:	Contact with Iron, Zinc, Aluminum, and other metals will generate explosive Hydrogen gas.
HAZARDOUS POLYMERIZATION:	Polymerization will not occur under normal storage and use conditions.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, IL 60021-0005

PRODUCT NAME: **KOBRA 550-A**

SECTION VI - SPILL, LEAK, AND DISPOSAL PROCEDURES

Contain small spills and leaks with inert material or absorbents. Place clean up material in container for approved disposal. Large spills may be contained by diked area with inert materials, earth, or clay. Remove all contaminated material for proper approved disposal. Notify proper authorities. Never flush to sewer.

WASTE DISPOSAL METHOD: Dispose of according to Federal, State and Local regulations.

SECTION VII - PRECAUTIONS FOR SAFE USE AND HANDLING

RESPIRATORY PROTECTION:	Use local or area mechanical room ventilation to reduce environmental concentrations to below permissible exposure levels. Respirators must be used when the permissible exposure levels may be exceeded. Use only MASHA/NIOSH approved air-purifying or supplied-air respirators.
SKIN PROTECTION:	Use industrial type rubber or plastic gloves, aprons, and boots as required to protect all areas of possible skin contact.
EYE PROTECTION:	Chemical goggles and full face shield should be worn.

SECTION VIII - SPECIAL PRECAUTIONS/ADDITIONAL INFORMATION

Store in tightly closed containers in a cool dry place away from alkaline and organic materials.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, IL 60021-0005

PRODUCT NAME: KOBRA 550-A

SECTION IX - TRANSPORTATION

DOT PROPER SHIPPING NAME: Chromic Acid Solution
DOT HAZARD CLASSIFICATION: Corrosive Material
DOT HAZARD IDENTIFICATION NUMBER: NA1755
HMIS RATINGS: Health:3, Flammability:0, Reactivity:2, Personal Protection:J

SECTION X - REGULATORY INFORMATION

Disposal of the product, or residues and waste material from this product should be made in compliance with Federal, State, and Local environmental laws.

CERLA-SARA CLASSIFICATION: According to EPA hazard Categories of Section 311 and 312 of the Superfund Amendment and reauthorization Act of 1986 (SARA Title III) the following categories are as follows: IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD, REACTION HAZARD, FIRE HAZARD.

This product contains substances subject to the reporting requirements of SARA Section 313 of Title III and 40 CFR part 372.

This information is given without any warranty or representation. We do not assume any legal responsibility for same, nor do we give permission, inducement, or recommendation to practice any patented invention without a license. It is offered solely for your consideration, investigation, and verification. Before using any product, read its label.

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Fax (708) 639-8911

24 Hr. Emergency No. - **CHEMTREC 1-800-424-9300**

SECTION I - PRODUCT INFORMATION

PRODUCT NAME: **KOBRA 550-B**

PRODUCT CLASS: Additive Solution

EFFECTIVE DATE: 03/08/94

MSDS # K0006 SUPERSEDES: N.A. First Issue PREPARED BY: MC

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	CAS #	WEIGHT	ACGIH TLV ppm (mg/m3)	OSHA PEL ppm mg/m3)
Silver Nitrate	7761-88-8	LT 3%	0.01	0.01

LEGEND: LT-Less Than N.A.- Not Applicable

SECTION III - HEALTH HAZARDS

CARCINOGENIC STATUS: None

EXPOSURE LIMITS: Keep vapor or mists concentration below recommended permissible exposure levels, component TLV values.

ROUTES OF ENTRY: Eye and skin contact, ingestion, skin absorption and inhalation of mists or vapors.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P. O. Box 5
Fox River Grove, 60021-0005

PRODUCT NAME: **KOBRA 550-B**

SECTION III - HEALTH HAZARDS (con't)

ACUTE EFFECTS: May cause eye irritation, burning, and corneal injury. Skin discoloration. Irritation of respiratory tract.

CHRONIC EFFECTS: May cause permanent corneal damage to the eyes after prolonged or massive exposure. Ingestion can cause burns on the mouth and throat, diarrhea, nausea, and death.

EMERGENCY FIRST AID PROCEDURES

INGESTION: Do not induce vomiting. Drink large amounts of water. Contact Physician for immediate medical attention.

EYE CONTACT: Flush with water for at least 15 minutes. Contact Physician for immediate medical attention.

SKIN CONTACT: Flush with plenty of water for at least 15 minutes. Remove contaminated clothing. Contact Physician for immediate medical attention. Wash clothing thoroughly before reuse.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Contact Physician at once for medical attention.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, IL 60021-0005

PRODUCT NAME: **KOBRA 550-B**

SECTION IV - PHYSICAL DATA

APPEARANCE AND ODOR:	Clear/Odorless
% VOLATILE BY WEIGHT:	N.A.
EVAPORATION RATE:	N.A.
SPECIFIC GRAVITY:	1.0
VAPOR DENSITY (AIR=1):	N.A.
SOLUBILITY IN WATER:	Complete
BOILING POINT:	Greater than 212 Degree F
PH:	@ 5%, 4.0
VAPOR PRESSURE (mmHg):	N.A.

SECTION V - PHYSICAL HAZARDS

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:	N.A.
METHOD USED:	N.A.
FLAMMABLE LIMITS (% IN AIR):	N.A.
EXTINGUISHING MEDIA:	Carbon Dioxide, Water.
SPECIAL FIRE FIGHTING PROCEDURES:	Wear self contained breathing respirators apparatus.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	Spontaneous ignition may occur with paper, trash, or organic material soaked with product and exposed to air.

REACTIVITY DATA

STABILITY:	Stable under normal conditions.
CONDITIONS TO AVOID:	Avoid storage or contact with alkaline materials.
INCOMPATIBILITY:	Avoid materials which are strong oxidants and organic.
DECOMPOSITION PRODUCTS:	No information.
HAZARDOUS POLYMERIZATION:	will not occur under normal conditions.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, IL 60021-0005

PRODUCT NAME: **KOBRA 550-B**

SECTION VI - SPILL, LEAK, AND DISPOSAL PROCEDURES

Contain small spills and leaks with inert material or absorbents. Place clean up material in container for approved disposal. Large spills may be contained by diked area with inert materials, earth, or clay. Remove all contaminated material for proper approved disposal. Notify proper authorities. Never flush to sewer.

WASTE DISPOSAL METHOD: Dispose of according to Federal, State and Local regulations.

SECTION VII - PRECAUTIONS FOR SAFE USE AND HANDLING

RESPIRATORY PROTECTION:	Use local or area mechanical room ventilation to reduce environmental concentrations to below permissible exposure levels. Respirators must be used when the permissible exposure levels may be exceeded. Use only MASHA/NIOSH approved air-purifying or supplied-air respirators.
SKIN PROTECTION:	Use industrial type rubber or plastic gloves, aprons, and boots as required to protect all areas of possible skin contact.
EYE PROTECTION:	Chemical goggles and full face shield should be worn.

SECTION VIII - SPECIAL PRECAUTIONS/ADDITIONAL INFORMATION

Store in tightly closed containers in a cool dry place away from strong oxidants and organic materials.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, IL 60021-0005

PRODUCT NAME: KOBRA 550-B

SECTION IX - TRANSPORTATION

DOT PROPER SHIPPING NAME: Chemical N.O.I.
DOT HAZARD CLASSIFICATION: N.A.
DOT HAZARD IDENTIFICATION NUMBER: N.A.
HMIS RATINGS: Health:2, Flammability:0, Reactivity:0, Personal Protection:E

SECTION X - REGULATORY INFORMATION

Disposal of the product, or residues and waste material from this product should be made in compliance with Federal, State, and Local environmental laws.

CERLA-SARA CLASSIFICATION: According to EPA hazard Categories of Section 311 and 312 of the Superfund Amendment and reauthorization Act of 1986 (SARA Title III) the following categories are as follows: IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD, REACTION HAZARD, FIRE HAZARD.

This product contains substances subject to the reporting requirements of SARA Section 313 of Title III and 40 CFR part 372.

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24 Hr. Emergency No. - **CHEMTREC 1-800-424-9300**

SECTION I - PRODUCT INFORMATION

PRODUCT NAME: **KOBRA 550-S**

PRODUCT CLASS: Chromic Acid Solution

EFFECTIVE DATE: 03/08/94

MSDS # K0008 SUPERSEDES: N.A. First Issue PREPARED BY: MC

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	CAS #	WEIGHT	ACGIH TLV ppm (mg/m3)	OSHA PEL ppm mg/m3)
Chromic Acid	1333-82-0	LT 20%	0.05	0.1

LEGEND: LT-Less Than N.A.- Not Applicable

SECTION III - HEALTH HAZARDS

CARCINOGENIC STATUS: Listed Carcinogen (NTP, OSHA, IARC) NTP, Yes.

EXPOSURE LIMITS: Keep vapor concentration below recommended permissible exposure levels, component TLV values.

ROUTES OF ENTRY: Eye and skin contact, ingestion, skin absorption and inhalation of mists or vapors.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P. O. Box 5
Fox River Grove, 60021-0005

PRODUCT NAME: **KOBRA 550-S**

SECTION III - HEALTH HAZARDS (con't)

ACUTE EFFECTS:	Corrosive to all body tissues. Eye and skin contact inhalation, and ingestion can cause severe irritation and burns. Inhalation, ingestion, and skin absorption can cause burns and nausea. Contact may cause ulceration of skin or chrome sores.
CHRONIC EFFECTS:	Will cause severe irritation and possible permanent damage to the eyes. Prolonged or massive exposure may cause kidney failure and or death.

EMERGENCY FIRST AID PROCEDURES

INGESTION:	Do not induce vomiting. Drink large amounts of water. Contact Physician for immediate medical attention.
EYE CONTACT:	Flush with water for at least 15 minutes. Contact Physician for immediate medical attention.
SKIN CONTACT:	Flush with plenty of water for at least 15 minutes. Remove contaminated clothing. Contact Physician for immediate medical attention. Wash clothing thoroughly before reuse.
INHALATION:	Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Contact Physician at once for medical attention.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, IL 60021-0005

PRODUCT NAME: **KOBRA 550-S**

SECTION IV - PHYSICAL DATA

APPEARANCE AND ODOR:	Red/Pungent Odor
% VOLATILE BY WEIGHT:	N.A.
EVAPORATION RATE:	N.A.
SPECIFIC GRAVITY:	1.14
VAPOR DENSITY (AIR=1):	Greater than 1
SOLUBILITY IN WATER:	Complete
BOILING POINT:	Greater than 212 Degree F
PH:	@ 5%, 1-3
VAPOR PRESSURE (mmHg):	N.A.

SECTION V - PHYSICAL HAZARDS

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:	N.A.
METHOD USED:	N.A.
FLAMMABLE LIMITS (% IN AIR):	N.A.
EXTINGUISHING MEDIA:	Carbon Dioxide, Water.
SPECIAL FIRE FIGHTING PROCEDURES:	Wear self contained breathing respirators apparatus.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	Heat and decomposition may produce hazardous vapor and foam. May generate explosive hydrogen gas upon contact with most metals.

REACTIVITY DATA

STABILITY:	Stable under normal conditions.
CONDITIONS TO AVOID:	Avoid storage or contact with alkaline materials.
INCOMPATIBILITY:	Avoid materials which are easily oxidized, oils, and organic materials.
DECOMPOSITION PRODUCTS:	Contact with Iron, Zinc, Aluminum, and other metals will generate explosive hydrogen gas.
HAZARDOUS POLYMERIZATION:	Polymerization will not occur under normal storage and used conditions.

MATERIAL SAFETY DATA SHEET

KOBRA PRODUCTS, INC.
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Fox River Grove, IL 60021-0005

PRODUCT NAME: **KOBRA 550-S**

SECTION VI - SPILL, LEAK, AND DISPOSAL PROCEDURES

Contain small spills and leaks with inert material or absorbents. Place clean up material in container for approved disposal. Large spills may be contained by diked area with inert materials, earth, or clay. Remove all contaminated material for proper approved disposal. Notify proper authorities. Never flush to sewer.

WASTE DISPOSAL METHOD: Dispose of according to Federal, State and Local regulations.

SECTION VII - PRECAUTIONS FOR SAFE USE AND HANDLING

RESPIRATORY PROTECTION:	Use local or area mechanical room ventilation to reduce environmental concentrations to below permissible exposure levels. Respirators must be used when the permissible exposure levels may be exceeded. Use only MASHA/NIOSH approved air-purifying or supplied-air respirators.
SKIN PROTECTION:	Use industrial type rubber or plastic gloves, aprons, and boots as required to protect all areas of possible skin contact.
EYE PROTECTION:	Chemical goggles and full face shield should be worn.

SECTION VIII - SPECIAL PRECAUTIONS/ADDITIONAL INFORMATION

Store in tightly closed containers in a cool dry place away from alkaline and organic materials.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, IL 60021-0005

PRODUCT NAME: KOBRA 550-S

SECTION IX - TRANSPORTATION

DOT PROPER SHIPPING NAME: Chromic Acid Solution
DOT HAZARD CLASSIFICATION: Corrosive Material
DOT HAZARD IDENTIFICATION NUMBER: UN 1755
HMIS RATINGS: Health:3, Flammability:0, Reactivity:2, Personal Protection:E

SECTION X - REGULATORY INFORMATION

Disposal of the product, or residues and waste material from this product should be made in compliance with Federal, State, and Local environmental laws.

CERLA-SARA CLASSIFICATION: According to EPA hazard Categories of Section 311 and 312 of the Superfund Amendment and reauthorization Act of 1986 (SARA Title III) the following categories are as follows: IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD, REACTION HAZARD, FIRE HAZARD.

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Fox River Grove, Il. 60021-0005
Phone: (708) 639-8910
Fax:(708) 639-8911

24 Hr. Emergency No. - **CHEMTREC 1-800-424-9300**

SECTION I - PRODUCT INFORMATION

PRODUCT NAME: **KOBRA-390**

PRODUCT CLASS: Additive Solution

EFFECTIVE DATE: 11/07/94

MSDS # K0040 SUPERSEDES: N.A. First Issue PREPARED BY: MC

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	CAS #	WEIGHT	ACGIH TLV ppm (mg/m3)	OSHA PEL ppm (mg/m3)

No hazardous materials are contained in this product.

LEGEND: LT-Less Than N.A.-Not Applicable

SECTION III - HEALTH HAZARDS

EFFECTS OF OVEREXPOSURE - EYE CONTACT: may cause eye irritation and burning sensation.

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KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, Illinois 60021-0005

PRODUCT NAME: **KOBRA-390**

SECTION III - HEALTH HAZARDS (con't)

EFFECTS OF OVEREXPOSURE - SKIN CONTACT: Slight skin irritation might occur.

EFFECTS OF OVEREXPOSURE - INHALATION: Breathing mist will cause coughing, irritation of nose and throat.

EFFECTS OF OVEREXPOSURE - INGESTION: may cause irritation.

EFFECTS OF OVEREXPOSURE - CHRONIC HAZARDS: Undetermined.

PRIMARY ROUTE(S) OF ENTRY: SKIN CONTACT, INHALATION, EYE CONTACT

EMERGENCY FIRST AID PROCEDURES

FIRST AID - EYE CONTACT: flush with water for least 15 minutes forcibly holding open eyelids. Seek immediate medical attention.

FIRST AID - SKIN CONTACT: Flush with water, clean with soap, remove and clean all contaminated clothing.

FIRST AID - INHALATION: Remove to fresh air. Seek immediate medical attention.

FIRST AID - INGESTION: Call a Physician.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, Illinois 60021-0005

PRODUCT NAME: **KOBRA 390**

SECTION IV - PHYSICAL DATA

APPEARANCE AND ODOR:	Amber/Soapy Odor
% VOLATILE BY WEIGHT:	N.A.
EVAPORATION RATE:	Less than water
SPECIFIC GRAVITY:	1.0
VAPOR DENSITY (AIR=1):	Lighter than air
SOLUBILITY IN WATER:	Complete
BOILING POINT:	212 F - 230 F
PH:	@ 5%, 5-8
VAPOR PRESSURE (MMHg):	N.A.

SECTION V - PHYSICAL HAZARDS

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:	N.A.
METHOD USED:	N.A.
FLAMMABLE LIMITS (% IN AIR):	N.A.
EXTINGUISHING MEDIA:	Use media appropriate to surrounding fire.
SPECIAL FIRE RIGHTING PROCEDURES:	Wear self contained breathing apparatus. Use media appropriate for surrounding fire.
UNUSUAL FIRE & EXPLOSION HAZARDS:	None known

M A T E R I A L S A F E T Y D A T A S H E E T

Kobra Products, Inc.
P.O. Box 5
Fox River Grove, IL 60021-0005

PRODUCT NAME: **KOBRA-390**

REACTIVITY DATA

STABILITY:	Stable under normal conditions.
CONDITIONS TO AVOID:	Contact with strong organic oxidizers.
INCOMPATIBILITY:	Keep away from strong organic oxidizers
DECOMPOSITION PRODUCTS:	Will not occur.
HAZARDOUS POLYMERIZATION:	Will not occur under normal conditions.

SECTION VI - SPILL, LEAK, AND DISPOSAL PROCEDURES

Contain small spills and leaks with inert material or absorbents. Place clean up material in container for approved disposal. Large spills may be contained by diked area with inert materials, earth, or clay. Remove all contaminated material for proper approved disposal. Notify proper authorities. Never flush to sewer.

WASTE DISPOSAL METHOD: Dispose of according to Federal, State, and Local regulations.

SECTION VII - PRECAUTIONS FOR SAFE USE AND HANDLING

RESPIRATORY PROTECTION: None required.

SKIN PROTECTION: Use industrial type rubber or plastic gloves, aprons, and boots as required to protect all areas of possible skin contact.

EYE PROTECTION: Chemical goggles and full face shield should be worn.

M A T E R I A L S A F E T Y D A T A S H E E T

Kobra Products, Inc.
P.O. Box 5
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PRODUCT NAME: **KOBRA-390**

SECTION VII - SPECIAL PRECAUTIONS/ADDITIONAL INFORMATION

Store in tightly closed containers in a cool dry place away from strong organic oxidizers.

SECTION IX - TRANSPORTATION

DOT PROPER SHIPPING NAME:	Electroplating Additive N.O.I.
DOT HAZARD CLASSIFICATION:	N.A.
DOT HAZARD IDENTIFICATION NUMBER:	N.A.

HMIS RATINGS: Health:0, Flammability:0, Reactivity:0
Personal Protection:X

SECTION X - REGULATORY INFORMATION

OSHA:	Non-hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200)
CERCLA - SARA HAZARD CATEGORY:	This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and Re-authorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:
SARA SECTION 313:	This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Re-authorization Act of 1986 and 40 CFR Part 372:

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, Illinois 60021-0005

PRODUCT NAME: **KOBRA 390**

---------- CHEMICAL NAME ---------- CAS NUMBER WT/WT % IS LESS THAN
No Sara Section 313 components exist in this product.

MATERIAL SAFETY DATA SHEET

RECEIVED
JUN 13 1994
SUPERIOR SOLVENT

ISOPROPYL ALCOHOL (99%)

MSDS No P000002-1-OSHA-AE
MSDS CLASS H
Ver. No 1
Ver. Date NOV 3 93

SUPERIOR
SOLVENTS AND CHEMICALS DIVISION
SUPERIOR SOLVENTS, INC.
320 NORTHPOINTE DRIVE • FAIRFIELD, OHIO 45014
513-870-9271 FAX 513-870-9549

IMPORTANT : Read this MSDS before handling and disposing of this product and pass this information on to the employees, customers, and users of this product. This product is covered by the OSHA Hazard Communication Rule and this document has been prepared in accord with the MSDS requirements of this rule.

Trade Name	ISOPROPYL ALCOHOL (99%)	Telephone Numbers : EMERGENCY 800/424-9300 CHEMTREC 610/353-8300 ARCO CHEM CUSTOMER SERVICE 800/321-7000 INFO ONLY
Other Company Names	None	
Synonyms	None	
Other Industry Names	IPA; Isopropanol; Dimethyl Carbinol	
Chemical Family	C3 Alcohol	DOT Hazardous Materials Proper Shipping Name Isopropanol
Generic Name	2-Propanol	DOT Hazard Class 3 (flammable liquid) DOT Reportable Quantity N/AP
CAS No. (See Section 9 - Components)	ACC Material ID BE104	UN/NA ID No. UN 1219

2. Summary of Hazards

Signal Word	DANGER
Physical Hazards	Extremely flammable liquid
Acute Health Effects (Short-Term)	Slight inhalation hazard Severe eye irritant Slight ingestion hazard No skin irritation hazard identified from data available No skin absorption hazard identified from data available
Chronic Health Effects (Long-Term)	Repeated or prolonged exposure to isopropanol can be irritating to mucosal membranes

3. Fire and Explosion

Flash Point	Autoignition Temperature	Flammable Limits
AP 53 °F (TCC)	AP 750 °F	(at Normal Atmospheric Temp and Pressure) Lower: AP 2 (% vol in air) Upper: AP 12.7 (% vol in air)

Fire and Explosion Hazards	Releases flammable vapors below normal ambient temperatures. When mixed with air and exposed to ignition source, vapors can burn in open or explode if confined. Vapors may be heavier than air. May travel long distances along the ground before igniting and flashing back to vapor source. Diluting with water may not suffice to raise flash point above ambient temperatures.
Extinguishing Media	Alcohol type foam CO2 Dry chemical Water spray Water fog
Extinguishing Media Use Comment	No additional information available
Special Firefighting Procedures	Do not enter fire area without proper protection. Fight fire from a safe distance/protected location. Heat may build enough pressure to rupture closed containers/spreading fire/increasing risk of burns/injuries. Water may be ineffective in firefighting due to low flash point. Use water spray/fog for cooling. Even if material is water soluble, may not be practical to extinguish fire by water dilution. Notify authorities immediately if liquid enters sewer/public waters.

4. Health Hazards

Summary of Acute Hazards	Moderate health hazard

ROUTE OF EXPOSURE	SIGNS AND SYMPTOMS	PRIMARY ROUTE(S)
Inhalation	Prolonged overexposure may cause coughing, shortness of breath, dizziness and intoxication.	Yes
Eye Contact	May cause severe eye irritation.	Yes
Skin Absorption	No significant signs or symptoms indicative of any health hazard are expected to occur as a result of skin absorption exposure.	No
Skin Irritation	No significant signs or symptoms indicative of any adverse health hazard are expected to occur as a result of skin exposure.	No
Ingestion	This material may be a slight health hazard if ingested in large quantities.	No

Summary of Chronic Hazards	Repeated or prolonged exposure may irritate the mucous membranes. See additional Tox information elsewhere in this document.
Special Health Effects	This material or its emissions may affect mucous tissue and/or aggravate mucous membrane dysfunction.

5. Protective Equipment and Other Control Measures

Respiratory	If exposure exceeds the PEL/TLV, use NIOSH/MSHA approved respiratory equipment as specified in the NIOSH/OSHA 1981 Occupational Health Guidelines for Chemical Hazards.
Eye	Eye protection, including both chemical splash goggles and face shield, must be worn when possibility exists for eye contact due to splashing/spraying liquid, airborne particles, or vapor. Contact lenses must not be worn.
Skin	Not normally considered a skin hazard. Where use can result in skin contact, practice good personal hygiene. Wash hands and other exposed areas with mild soap and water before eating, drinking, smoking, and when leaving work.
Engineering Controls	No special ventilation is usually required to meet exposure standard(s) beyond that needed for normal comfort control.
Other Hygienic Practices	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.
Other Work Practices	Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove soiled clothing/wash thoroughly before reuse. Shower after work using plenty of soap and water.

6. Occupational Exposure Limits

Substance	Source	Date	Type	Value/Units	Time	Skin
Isopropyl Alcohol	ACGIH	1992	TWA	400 PPM	8 HRS	No
			STEL	500 PPM	15 MIN	No
	OSHA	1989	TWA	400 PPM	8 HRS	No
			STEL	500 PPM	15 MIN	No

Industrial Hygiene Comments	No additional Occupational Exposure Limit Information available

7. Emergency and First Aid

Inhalation	Remove victim to fresh air immediately. Give oxygen or artificial respiration as needed. Obtain emergency medical attention. Prompt action is essential.
Eye Contact	In case of eye contact, immediately rinse with clean water for 20-30 minutes. Retract eyelids often. Obtain emergency medical attention.
Skin Contact	Remove contaminated clothes or shoes. Wash skin thoroughly with mild soap and water. Flush with lukewarm water for 15 minutes. If sticky, use waterless cleaner first.
Ingestion	If large quantity swallowed, give lukewarm water (1/2 litre/pint) if victim completely conscious/alert. Do not induce vomiting; risk of damage to lungs exceeds poisoning risk. Obtain emergency medical attention.
Emergency Medical Treatment Procedures	If pain, blinking, tears, or redness continue, patient should contact ophthalmologist.
Detoxification Procedures	Treat symptomatically.

8. Spill and Disposal

Precautions if Material is Spilled or Released
Extremely flammable liquid. Release causes immediate fire/explosion hazard. Liquids/vapors may ignite. Evacuate/limit access. Extinguish all ignition sources. Stop release. Prevent flow to sewer/public waters. Restrict water use for cleanup. Notify fire and environmental authorities. Impound/recover any land spill. Blanket with firefighting foam. Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Use suitable disposal containers. On water, material is soluble and may float or sink. May biodegrade. Contain/collect rapidly to minimize dispersion. Disperse residue. Report per regulatory requirements.

Waste Disposal Methods
Contaminated product/soil/water may be RCRA/OSHA hazardous waste due to potentially low flash point. (See 40 CFR 261 and 29 CFR 1910). Landfill solids at permitted sites. Use registered transporters. Burn concentrated liquids in systems compatible with water soluble wastes. Avoid flameouts. Assure emissions comply with applicable regulations. Dilute aqueous waste may biodegrade. Avoid overloading/poisoning plant biomass. Assure effluent complies with applicable regulations.

9. Components

(This may not be a complete list of components.) (Compositions are typical values, not specifications.)

Component Name	CAS No.	Composition Amount (Wt.)	Carcinogen ###
Isopropyl Alcohol	67-63-0	AP 99 %	N/P

1 = National Toxicology Program 2 = International Agency for Research on Cancer 3 = Occupational Health and Safety Administration 4 = Other

10. Component Health Hazards

Component	Component Health Hazards	
Isopropyl Alcohol	Damages developing fetus	Severe eye irritant
	Mucous membrane irritant	

11. Additional Toxicological Information

Component Name/Comments

Isopropyl Alcohol

Isopropyl Alcohol
Isopropyl alcohol, when given to pregnant rats has been reported in one study to be toxic to the developing fetus at levels of 2.5% in drinking water. No teratogenic effects were, or have been, reported. There are no reports of adverse reproductive effects in humans exposed to this chemical.

Material
No additional toxicology information is available for this material

12. Physical and Chemical Data

Boiling Point AP 180 °F	**Viscosity** N/DA	**Dry Point** N/AP
Freezing Point AP -127 °F	**Vapor Pressure** AP 33 MM HG (at 68° F)	**Volatile Characteristics** Appreciable
Specific Gravity AP .78 at 68 °F (H2O = 1.0 at 39.2° F)	**Vapor Specific Gravity** AP 2.1 (Air = 1.0 at 60-90° F)	**Solubility in Water** Complete (In All Proportions)
pH N/AP	**Hazardous Polymerization** Not expected to occur	**Stability** Stable

Other Chemical Reactivity	No additional information available
Other Physical and Chemical Properties	No additional information available

12. Physical and Chemical Data (Cont'd)

Appearance and Odor	Liquid; Medicinal odor analogous to rubbing alcohol; Odor threshold: AP 200 PPM; Clear, colorless
Conditions to Avoid	Heat, sparks, open flame, other ignition sources, and oxidizing conditions
Materials to Avoid	Aluminum metals, Nitroform, Strong oxidizing agents, Sulfuric acid
Hazardous Decomposition Products	Incomplete combustion may produce carbon monoxide and other toxic gases

13. Hazards Rating Information

National Fire Protection Association
No hazards rating information is available for this system

National Paint and Coatings Association

Hazardous Materials Information System (HMIS)
No hazards rating information is available for this system

14. Additional Precautions

Handling and Storage Procedures
Store in tightly closed, properly vented containers away from heat, sparks, open flame and strong oxidizing agents. Use only non-sparking tools. Store closed drums with bung in up position. Carefully vent any internal pressure before removing closure. Containers must be properly grounded before beginning transfer. All equipment must conform to applicable electrical code. Handle empty containers with care; vapor residue may be flammable/explosive. Material may attack some forms of plastic, aluminum, rubber and coatings.

Decontamination Procedures
Isolate, vent, drain, wash and purge systems or equipment before maintenance or repair. Remove all ignition sources. Check atmosphere for explosiveness and oxygen deficiencies. Use adequate personal protective equipment. Observe precautions pertaining to confined space entry.

15. Regulatory Information

FEDERAL:

Toxic Substance Control Act (TSCA)
The following is the TSCA Chemical Substance Inventory Status of the components of this material with CAS numbers listed in Section 9 - Components:

CHEMICAL	CAS NO.	STATUS
Isopropyl Alcohol	67-63-0	Listed - Non Confidential

Superfund Amendments and Reauthorization Act of 1988 (SARA), Title III

- Section 302/304

Requires emergency planning based on 'Threshold Planning Quantities' (TPQs), and release reporting based on Reportable Quantities (RQs) of "Extremely Hazardous Substances" (EHS) listed in Appendix A of 40 CFR 355. There are no components of this material with known CAS numbers which are on the EHS list.

- Section 311 & 312

Based upon available information, this material and/or components are classified as the following health and/or physical hazards according to Section 311 & 312:

Immediate (Acute) Health Hazard
Fire Hazard

- Section 313

The material does not contain any chemical components with known CAS numbers that exceed the De Minimis reporting levels established by SARA Title III, Section 313 and 40 CFR 372.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)

No chemicals in this material with known CAS numbers are subject to the reporting requirements of CERCLA.

OSHA Regulations

'Chemical-specific' OSHA regulations (1910.1002 to 1910.1050) presented under 29 CFR 1910 do not apply to this material or its components.

Other EPA Regulations

No additional information available

Department of Transportation (DOT)

Other than the normal shipping instructions and information given in this MSDS, there are no other specific DOT regulations governing the shipment of this material.

STATE REGULATIONS:

California Safe Drinking Water and Toxic Enforcement Act of 1988 - Proposition 65

This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins under California Proposition 65 at levels which would be subject to the proposition.

California South Coast Air Quality Management District (SCAQMD) Rule 443.1 (VOC's)

A Volatile Organic Compound (VOC) is any volatile compound of carbon excluding methane, carbon monoxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, 1,1,1-trichloroethane, methylene chloride, (FC-23), (CFC-113), (CFC-12), (CFC-11), (CFC-22), (CFC-114), and (CFC-115). By this definition, this is a VOC material.

15. Regulatory Information (Cont'd)

Massachusetts Right-to-Know Substance List (MSL) [105 CMR670.000]

Hazardous Substances (MSL-HS) on the MSL must be identified when present in materials at levels greater than state specified criterion. The criterion is: >= 1%. Components with CAS numbers present in this material at a level which could require reporting under the statute are:

CHEMICAL	CAS NO.
Isopropyl Alcohol	67-63-0

Extraordinarily Hazardous Substances (MSL-EHS) on the MSL must be identified when present in materials at levels greater than state specified criterion. The criterion is >= 0.0001%. Components with CAS numbers present in this material, at levels specified in Section 9 - Components, do not require reporting under the statute.

New Jersey Registration

The New Jersey, Registry 3, Registration law does not apply to this material, as none of its components are trade secrets.

Pennsylvania Right-to-Know Hazardous Substances Lists

Environmental Hazards (PA-EH) must be identified when present in materials at levels greater than the state specified criterion. The criterion is >= 0.01%. Components with CAS numbers in this material at a level which could require reporting under the statute are:

CHEMICAL	CAS NO.
Isopropyl Alcohol	67-63-0

Hazardous Substances (PA-HS) must be identified when present in materials at levels greater than the state specified criterion. The criterion is >= 1%. Components with CAS numbers in this material at a level which could require reporting under the statute are:

CHEMICAL	CAS NO.
Isopropyl Alcohol	67-63-0

Special Hazardous Substances (PA-SHS) must be identified when present in materials at levels greater than the state specified criterion. The criterion is >= 0.01%. Components with CAS numbers present in this material, at levels specified in Section 9 - Components, do not require reporting under the statute.

Regulatory Advisory

If you reformulate or further process this material, you should consider re-evaluation of the regulatory status of the components listed in Section 9, based on the final composition of your product.

16. Label Information

Manufacturer:
ARCO Chemical Company
3801 West Chester Pike
Newtown Square
PA 19073 USA

Telephone Numbers :
EMERGENCY
800/424-9300 CHEMTREC
610/353-8300 ARCO CHEM
CUSTOMER SERVICE
800/321-7000 INFO ONLY

Other Company Names None

Signal Word DANGER

Use Statement
For industrial use only
Keep out of reach of children

Physical Hazards
Extremely flammable

Health Hazards
Severe eye irritant
Inhalation hazard
Ingestion hazard
Prolonged exposure may affect mucous membranes

Precautionary Measures
Do not handle near heat, sparks, or open flame
Do not store near combustible materials
Avoid contact with eyes
Avoid prolonged or repeated breathing of gases, vapors, or mists
Use with adequate ventilation
Prevent contact with food, chewing, or smoking materials
Do not take internally
Keep container tightly closed when not in use
Do not store this material in aluminum containers

DOT Information: UN/NA ID No. UN 1219 DOT Hazard Class 3 (flammable liquid) DOT Reportable Quantity N/AP

DOT Hazardous Materials Proper Shipping Name Isopropanol

Component Name	CAS No.	Composition Amount (Wt.)	RQ
Isopropyl Alcohol	67-63-0	AP 99 %	N/AP

Instructions: In case of fire, use: Alcohol type foam; CO2; Dry chemical; Water spray; Water fog

First Aid:

Inhalation	Remove victim to fresh air immediately. Give oxygen or artificial respiration as needed. Obtain emergency medical attention. Prompt action is essential.
Eye Contact	In case of eye contact, immediately rinse with clean water for 20-30 minutes. Retract eyelids often. Obtain emergency medical attention.
Skin Contact	Remove contaminated clothes or shoes. Wash skin thoroughly with mild soap and water. Flush with lukewarm water for 15 minutes. If sticky, use waterless cleaner first.
Ingestion	If large quantity swallowed, give lukewarm water (1/2 litre/pint) if victim completely conscious/alert. Do not induce vomiting; risk of damage to lungs exceeds poisoning risk. Obtain emergency medical attention.
In case of spill,	Extremely flammable liquid. Release causes immediate fire/explosion hazard. Extinguish all ignition sources. Impound/recover large land spill; soak up small spill with inert solids. On water, may biodegrade. Contain/collect rapidly to minimize dispersion. Report per regulatory requirements.

Protective Equipment

Respiratory	Use only NIOSH/MSHA approved respiratory protection equipment per 1981 NIOSH/OSHA Guidelines for Chemical Hazards.
Eye	Chemical splash goggles and/or face shield should be worn.
Skin	No special clothing normally required. Where use can result in skin contact, wash thoroughly before eating, drinking, smoking, or leaving work.

Label No.:	LP000002	Version No.:	1	Date:	SEP 1 1993

17. General Comments

General Comments
No additional information available.

Other Comments
Some of the information presented and conclusions drawn herein are from sources other than direct test data on the material itself.

Note	EQ=Equal	AP=Approximately	N/P=No applicable information found
Qualifications:	LT=Less Than	UK=Unknown	N/AP=Not applicable
	GT=Greater Than	TR=Trace	N/DA=No Data Available

Disclaimer of Liability

The information in the MSDS was obtained from sources which we believe are reliable. HOWEVER, THE INFORMATION IS PROVIDED WITHOUT ANY WARRANTY, EXPRESS OR IMPLIED, REGARDING ITS CORRECTNESS.

The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. FOR THIS AND OTHER REASONS, WE DO NOT ASSUME RESPONSIBILITY AND EXPRESSLY DISCLAIM LIABILITY FOR LOSS, DAMAGE OR EXPENSE ARISING OUT OF OR IN ANY WAY CONNECTED WITH THE HANDLING, STORAGE, USE OR DISPOSAL OF THE PRODUCT.

This MSDS was prepared and is to be used only for this product.
If the product is used as a component in another product, this MSDS information may not be applicable.

Print Date

May 22, 1994

MATERIAL SAFETY DATA SHEET

CORCO

CORCO CHEMICAL CORPORATION • TYBURN ROAD & CEDAR LANE • FAIRLESS HILLS, PA. 19030 • 215/295-5006
Manufacturers of Reagent and Electronic Chemicals

IDENTITY *(As Used on Label and List)*	*Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.*
Ammonium Hydroxide #800	

Section I

Manufacturer's Name Corco Chemical Corporation	Emergency Telephone Number (215) 295-5006/5007
Address *(Number, Street, City, State, and ZIP Code)* Tyburn Rd. & Cedar Lane	Telephone Number for Information
Fairless Hills, Penna. 19030	Date Prepared 1/23/92 (7/75 - 5/90)
	Signature of Preparer *(optional)*

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity, Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% *(optional)*
Ammonium Hydroxide, NH_4OH	35 ppm	25 ppm	IDLH	
	27 ppm	18 mg/m^3	500 ppm	

Common Names (Synonyms)

Aqua Ammonia
Ammonia Water
Ammonia Aqueous
Ammonia Solution (DOT)

Indexed as:
CAS 1336 21 6, RTECS BQ 9625 000
UN 2672
NA 2672
NFPA 2 --

DOT Corrosive Material

Section III — Physical/Chemical Characteristics

30% Solution

Boiling Point 28°C	83°F	Specific Gravity (H_2O = 1) @ 20°C	0.9
Vapor Pressure (mm Hg) @ 80°F	720	Melting Point -72.2°C	-98°F
Vapor Density (AIR = 1) 1.2		Evaporation Rate (Butyl Acetate = 1)	N/A

Solubility in Water
Miscible

Appearance and Odor
Colorless Liquid. Distinct Odor,

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
N/A	(NH_3)	16%	25%

Extinguishing Media
Water Spray. Also water spry to cool flame exposed containers,

Special Fire Fighting Procedures
Stay upwind. Wear positive pressure self-contained breathing apparatus and full protective equipment.

Unusual Fire and Explosion Hazards
Heating to decomposition may cause emission of toxic fumes. Closed containers may explode in heat of fire.

Section V — Reactivity Data

Stability			Conditions to Avoid
	Unstable		Heat & Flame
	Stable	X	

Incompatibility (*Materials to Avoid*) Acids, Dimethyl Sulfate, Silver, Acrolein, Copper, Mercury, Calcium, Halogens, Gold, Aqua Regia, Hypochlorite Bleaches.

Hazardous Decomposition or Byproducts

NH_3, NO_x

Hazardous Polymerization			Conditions to Avoid
	May Occur		Heat, Flame and Contamination
	Will Not Occur	X	

Section VI — Health Hazard Data

Route(s) of Entry	Inhalation?	Skin?	Ingestion?
	Yes	Yes	Yes

Health Hazards (*Acute and Chronic*)

Possibly fatal if inhaled or swallowed. Vapor extremely irritating. Liquid causes severe burns.

Carcinogenicity	NTP?	IARC Monographs?	OSHA Regulated?
	not reported	not reported	not as carcinogen

Signs and Symptoms of Exposure

Eye, Nose, Throat irritation. Chest pain, Pulmonary Edema, Skin Burns.

Medical Conditions Generally Aggravated by Exposure Skin, Eyes, Respiratory System. Person with Corneal Disease, Glaucoma or chronic respiratory diseases may suffer increased risk.

Emergency and First Aid Procedures

Eye, Skin - immediate, continous water flush until medical assistance arrives. Inhalation - remove to fresh air. Ingestion-Call Physician!!!!

Section VII — Precautions for Safe Handling and Use

Steps to Be Taken in Case Material Is Released or Spilled Eliminate ignition sources. Wear self-contained breathing apparatus and full protective equipment. Dilute spill with water. Take up with non-combustible absorbent and containerize for later disposal.

Waste Disposal Method

To be performed in compliance with all current Local, State and Federal Regulations.

Precautions to Be Taken in Handling and Storing

Avoid vapor. Keep container closed, away from heat. Beware of containers possible internal pressure. Store in a cool place, below 83°F.

Other Precautions

Observe all label precautions when handling "Empty" containers and possible residue there-in.

Section VIII — Control Measures

Respiratory Protection (*Specify Type*)

Self-contained breathing apparatus @ 250 ppm

Ventilation			
	Local Exhaust	Recommended	Special
	Mechanical (*General*)	Recommended	Other

Protective Gloves	Eye Protection
Rubber	Full face shield splash goggles.

Other Protective Clothing or Equipment

Chemical resistant clothing, Eye wash, Safety showers.

Work/Hygienic Practices

Work safely. Respect the material. Wash after handling.

▲ USGPO 1986-491-529/45775

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MATERIAL SAFETY DATA SHEET

FOR COATING, RESINS, AND RELATED MATERIALS

Date of Preparation 3/02/94

Manufacturer: EGYPTIAN LACQUER MFG. CO. INC.
Address : 555 Sagamore Parkway South
P.O. BOX 4449
Lafayette, Indiana 47903

Telephone#: (317) 447-2136 Night: (317) 447-2136
Emergency#: 1-800-424-9300 Night: 1-800-424-9300

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SECTION I PRODUCT IDENTIFICATION

Manufacturer's Code Identification: CQMF-L54 Rev Code
Product Class: POLYESTER WATER BORNE BAKING ENAMEL (CLEAR)
D O T Description: "PAINT UN-1263"

HMIS Information: Health- 4 Flammability- 2
Reactivity- 0 Personal Protection Equipment- I
HAZARD INDEX: 4= Severe 3= Serious 2= Moderate 1= Slight 0= Least
I = }
Safety Glasses, Gloves, & Combination Dust and Vapor Respirator

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SECTION II HAZARDOUS INGREDIENTS

--- INGREDIENT ----- MATERIAL DESCRIPTION REF#	CAS#	% BY WT.	ACGIH TLV(TWA) PPM	OSHA PEL PPM	LEL	VAPOR PRESSURE OTHER LIMITS
02 BUTYL CELLOSOLVE	/111-76-2	/ 3.60	/ 25.00	/ 50.00	1.1	.88
03 N-BUTYL ALCOHOL 99 %	/71-36-3	/ 3.00	/ 50.00	/ 100.00	1.4	4.00
04 DIMETHYLETHANOLAMINE	/108-01-0	/ .5 - 5	/NOT EST	/NOT EST	7.1	4.40
10 N-PROPOXYPROPANOL	/1569-01-3	/ 5 - 10	/NOT EST	/NOT EST	1.3	1.70
	% LEAD	.00				
	% CHROMATE	.00				

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This product contains no reported carcinogens or suspected carcinogens.

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SECTION III PHYSICAL DATA

Boiling Range: High- 343.0 F Low- 242.0 F
Vapor Pressure: 4.40 MMHG @68 F
Vapor Density: Heavier Than Air
Evaporation Rate: Slower than Butyl Acetate
Weight per Gallon: 8.6
% Volatile by Volume: 65.99
% Volatile by Weight: 60.93
VOC: 2.933
Physical State: LIQUID
Appearance: N/A
Odor: N/A
Odor Threshold: N/A
pH: N/A
Freezing Point: N/A
Water Solubiltiy: N/A
Coefficient of Water/Oil Distribution: N/A

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flammability Classification: Class II DOT: COMBUSTIBLE LIQUID
Actual Flashpoint TCC: 137.0 F
Explosion Level: Lower- 1.1 Upper- 16.9
Upper Flammability Limit: N/A
Auto Ignition Temperature: N/A
Based on the presence of components (08)
PLEASE NOTE: This water based material is self extinguishing and will not support combustion. The material will flash at approximately the stated temperature but immediately extinguishes.

EXTINGUISHING MEDIA:
Use CO2, DRY CHEMICAL, FOAM, ALCOHOL FOAM, or WATER FOG

Use National Fire Protection Association (NFPA) Class B extinguisher (carbon dioxide, dry chemical or foam) designed to extinguish NFPA Class 1B flammable liquid fires.
HEAT PROTECTION PROCEDURES
Containers exposed to intense heat from fires should be cooled with water to prevent vapor pressure buildup which could result in container rupture.
UNUSUAL FIRE AND EXPLOSION HAZARDS:
Keep containers tightly closed. Isolate from heat, electrical equipment, sparks and open flame. Closed container may explode when exposed to extreme heat. Do not apply to hot surfaces. Never use welding cutting torch on or near container (even empty) because product (even residue) may ignite explosively.
SPECIAL FIRE FIGHTING PROCEDURES
Water spray may be ineffective. Water may be used to cool closed containers to prevent pressure buildup and possible autoignition or explosion when exposed to extreme heat. If water is used, fog nozzles are preferable.
Based on the presence of components (04) This liquid and vapor is a dangerous fire hazard and moderate explosion hazard when exposed to heat or flame. Heavier-than-air vapors can flow along surfaces to distant ignition sources and flash back.
Based on the presence of components (02,03,04) Fire fighters should use self-contained breathing apparatus with full facepiece.
A water stream can scatter flames. A spray of water may be used to cool fire-exposed containers.

SECTION V HEALTH HAZARD DATA

EFFECTS OF EXCESSIVE OVEREXPOSURE
Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal. Do not breathe vapors or spray mist. Wear an appropriate, properly fitted respirator (NIOSH/MSHA approved) during and after application unless air monitoring demonstrates vapor/mist levels are below applicable limits. Follow respirator manufacturer's directions for respirator use.
Based on the presence of components (04) Excessive inhalation of vapors can cause nasal and respiratory irritation, dizziness, weakness, fatigue, nausea, headache, possible unconsciousness and even asphyxiation.
Based on the presence of components (04) symptoms of overexposure to this product may include headache, nausea, vomiting, drowsiness, and loss of consciousness.
Based on the presence of components (02) Headaches, nausea, dizziness, and vomiting may occur from inhalation.
Based on the presence of components (03) This product is irritating to the mucous membrane.
Based on the presence of components (10) this product may cause irritation to the upper respiratory tract.
Based on the presence of components (10) chronic overexposure to this product may cause kidney and liver injury.
Based on the presence of components (02,10) ingestion of this product will cause irritation of the gastrointestinal tract and may cause effects resembling those from inhalation of vapor.
Ingestion may cause possible liver damage.
Ingestion may cause possible kidney damage.
Based on the presence of components (02,03) this product may cause nose and throat irritation.
Based on the presence of components (02,03,04) this product can be irritating to the eyes.
Based on the presence of components (10) this product is severely irritating to the eyes. Exposure may cause extensive corneal injury.
Based on the presence of components (03) this product may cause skin irritation and drying/defatting or cracking, and dermatitis on repeated or prolonged exposure to the skin.

FIRST AID PROCEDURES:

EYE CONTACT: If this product comes in contact with eyes, gently flush with large quantities of water for at least 15 mins and seek medical attention.
SKIN CONTACT: If this product comes in contact with skin, remove the contaminated clothing promptly, wash affected skin areas with large quanitities of water and seek medical attention if irritation from contact persists.
INHALATION: If breathing difficulties, dizziness or light headedness occur when working in areas with high vapor concentration, victim should seek fresh air free of vapors. If victim experiences continued breathing

difficulties, oxygen, where available should be administered by qualified personnel until medical assistance can be rendered. If breathing stops, begin artificial respiration and seek medical attention.
INGESTION: Rinse mouth immediately. Give exposed individual 6 to 8 ounces of liquid. (NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON). DO NOT induce vomiting unless advised by a physician. Contact a physician.

SECTION VI REACTIVITY DATA

CONDITIONS TO AVOID:
Avoid exposure to sparks, open flame, hot surfaces, and all sources of heat and ignition.
INCOMPATABILITY (Materials to Avoid):
Based on the presence of components (02) this raw material is incompatible with strong oxidizing agents, strong mineral acids, alkali metals, and halogens.
STABILITY:
This product is stable.
HAZARDOUS POLYMERIZATION:
Will not occur.
Thermal decomposition in the presence of air may yield carbon monoxide and/or carbon dioxide.
INCOMPATABILITY (Materials to Avoid):
Based on the presence of components (03) this product is incompatible with strong oxidizing agents. Contact with these materials may cause adverse reactions.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
Stay upwind and away from spill unless wearing appropriate protective equipment. Stop and/or contain discharge if it may be done safely. Keep all sources of ignition away. Ventilate area of spill. Use non-sparking tools for cleanup. Cover with inert material to reduce fumes. Keep out of drains, sewers, or waterways. Contact fire authorities. Notify local health and pollution control agencies. Call spill response teams if large spill.
WASTE DISPOSAL METHOD:
Dispose of product in accordance with applicable local, county, state, and federal regulations. Do Not Flush to Sewer, Watershed or Waterway.
Based on the presence of components (02) do NOT flush to sewer, watershed, or waterway.

SECTION VIII SAFE HANDLING AND USE INFORMATION

EGYPTIAN LACQUER MFG. CO. INC. takes no responsibility for determining what measures are required for personal protection in any specific application. The general information given should be used with discretion.

PROTECTIVE GLOVES:
Required for prolonged or repeated contact. Wear resistant gloves such as natural rubber, neoprene, buna N or nitrile. An apron should be worn to avoid skin contact.
VENTILATION:
Use ventilation as required to control vapor concentrations. Avoid prolonged or repeated breathing of vapors. If exposure exceeds TLV, use a NIOSH-approved respirator to prevent overexposure.
HYGIENIC PRACTICES:
WASH HANDS THOROUGHLY BEFORE EATING AND USING WASHROOM
Remove contaminated clothing immediately and do not wear it until it has been properly laundered.
Avoid contact with eyes. Wear goggles if there is a likelihood of contact with eyes.
Based on the presence of components (02,03) Eyewash stations and safety showers should be readily available in both the use and handling areas.

SECTION IX SPECIAL PRECAUTIONS

HANDLING AND STORING PRECAUTIONS
Keep product containers cool, dry, and away from sources of ignition. Use and store this product with adequate ventilation. Do NOT smoke in storage areas.
Personnel should avoid inhalation of vapors. Personal contact with the product should be avoided. Should contact be made, remove saturated clothing and flush affected skin areas with water. Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in this sheet must be observed.
*****
NOTICE - Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal.

SECTION X Section 312/313 Toxic Chemicals

This Product contains the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40 CFR 372:

Chemical	CAS Number	Weight %
BUTYL CELLOSOLVE	111-76-2	3.60
BUTYL ALCOHOL 99 %	71-36-3	3.00

The options expressed herein are those of qualified personnel within EGYPTIAN LACQUER MFG. CO. or its suppliers. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and these opinions and the conditions of use of the product are not within the control of EGYPTIAN LACQUER MFG. CO., it is user's obligation to determine the conditions for safe use of the product.

Enthone-OMI, Inc.

a subsidiary of ASARCO

MATERIAL SAFETY DATA SHEET

ENTHONE

ENTHOBRITE® WAZ

P.O. BOX 1900
NEW HAVEN, CT 06508

(203) 934-8611

24 HOUR EMERGENCY PHONE NUMBERS
CHEMTREC 800-424-9300 (Transportation)
MFSA 313-644-5626
NON-EMERGENCY PHONE NUMBERS
ENTHONE 203-934-8611
UDYLITE 313-497-9100
SEL-REX 313-497-9100

PRODUCT CODE#: 4202
DATE ISSUED: 10/17/90
SUPERCEDES: 6/25/87
PREPARER: J.A. Zehnder/S.D. Koch

SDK

II. HAZARDOUS INGREDIENTS

COMPONENT	COMMON NAME	CAS NO.	OSHA-PEL	ACGIH-TLV	%
Alkylarylsulfonic acids, disodium salts		25167-32-2	NI*	NI*	<10
Water		7732-18-5	NI	NI	>90

*Recommended TWA: 5 mg/m3

III. PHYSICAL PROPERTIES

SPECIFIC GRAVITY (WATER =1)	1.026	BOILING POINT, °F	216
EVAP.RATE (BUTYL ACETATE=1)	NI	MELTING POINT, °F	32
VAPOR PRESSURE, mmHg	NI	SOLUBILITY IN WATER	complete
VAPOR DENSITY (AIR=1)	NI	APPEARANCE	pale yellow liquid
pH (AS IS)	9.1	ODOR	none

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT, °F	None	FLAMMABLE LIMITS (AIR)	NA	LEL	NA	U

EXTINGUISHING MEDIA

[X] Not Combustible [X] Water fog or spray [X] Carbon Dioxide [ ] Dry Chemical [ ] Alcohol Foam [X] Foam [ ] Sand or Earth

SPECIAL FIRE FIGHTING PROCEDURES

In case of fire keep container cool in order to avoid rupture and spillage of material

UNUSUAL FIRE AND EXPLOSION HAZARDS

When exposed to high temperatures may generate toxic oxides of sulfur.

V. HEALTH HAZARD DATA

EFFECTS OF ACUTE EXPOSURE:

INHALATION: Mist or vapor may irritate respiratory tract.

INGESTION: Can cause irritation to mouth, throat, esophagus, and stomach.

SKIN: Can cause irritation.

EYES: Can cause severe irritation, damage to eyes.

EFFECTS OF CHRONIC EXPOSURE:

Chronic exposure effects not established.

CARCINOGEN: Not listed NTP, IARC, OSHA

REFERENCE:

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove person from contaminated area. If breathing has stopped, resuscitate and administer oxygen if available.
Seek immediate medical attention.

INGESTION: Never give anything by mouth to an unconscious person, obtain immediate medical attention. If vomiting occurs spontaneously, keep airway clear. If swallowed give large amounts of water and INDUCE VOMITING.
Seek immediate medical attention.

SKIN: Immediately wash contaminated skin with plenty of water for 15 minutes. Remove contaminated clothing and footwear. Wash clothing before reuse. Discard footwear if it cannot be decontaminated.
Seek immediate medical attention.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds of exposure is essential to minimize damage.
Seek immediate medical attention.

VI. PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL PROCEDURES:
Avoid contact with skin, eyes, and clothing. Wear protective equipment (see Section VII). Dispose of in accordance with Local, State, and Federal regulations.

STORAGE AND HANDLING PRECAUTIONS:
Store in a cool, dry place. Keep away from acids and oxidizers. Loosen cover cautiously when opening.

ADDITIONAL INFORMATION:
Wash thoroughly after handling.

VII. CONTROL MEASURES

VENTILATION: Local exhaust recommended.

RESPIRATOR: Use NIOSH approved respirator when air concentration is greater than the TLV or PEL.
Use cartridge filter for organic vapors.

EYE PROTECTION: [ ] Safety glasses [X] Chemical safety goggles [X] Face shield

PROTECTIVE GLOVES: [X] Neoprene [X] Natural rubber Other:

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:
Chemically resistant coveralls, hat, and shoes or boots.

WORK/HYGENIC PRACTICES:
Emergency eye wash and safety shower should be available. Wash thoroughly after handling.

ADDITIONAL INFORMATION:
For waste disposal of operating solutions consult Enthone-OMI Waste Disposal Procedures. For major spills consult Enthone-OMI for disposal assistance. Dispose of in accordance with Local, State, and Federal regulations.

CAS = Chemical Abstract Service
NI = No relevant information available
NA = Not applicable
Trade Secret = Claimed as allowed under 29 CFR 1910.1200
PEL = OSHA Permissible Exposure Limit
TLV = ACGIH Threshold Limit Value
NTP = National Toxicology Program
IARC = Int'l Agency for Research on Cancer

VIII. REACTIVITY DATA

X	Stable	CONDITIONS TO AVOID:	Stable under normal conditions. See Incompatibility information.
	Unstable		

INCOMPATABILITY (Materials to avoid): Acids

HAZARDOUS DECOMPOSITION PRODUCTS: Toxic carbon monoxide, carbon dioxide, oxides of sulfur.

HAZARDOUS POLYMERIZATION		May occur	CONDITIONS TO AVOID: NA
	X	Will not occur	

IX. ADDITIONAL INFORMATION

Enthone-OMI, Inc.

a subsidiary of ASARCO

MATERIAL SAFETY DATA SHEET

ENTHONE

ENTHOBRITE® NCZ-4211

P.O. BOX 1900
NEW HAVEN, CT 06508

(203) 934-8611

24 HOUR EMERGENCY PHONE NUMBERS
CHEMTREC 800-424-9300

NON-EMERGENCY PHONE NUMBERS

ENTHONE	203-934-8611
UDYLITE	313-497-9100
SEL-REX	313-497-9100

PRODUCT CODE#: 4456
DATE ISSUED: 11/19/87
SUPERCEDES: 1/84
PREPARER: F.R. Hirtler

RFH/KBK

II. HAZARDOUS INGREDIENTS

COMPONENT	COMMON NAME	CAS NO.	OSHA-PEL	ACGIH-TLV	%
Sodium metasilicate pentahydrate		6834-92-0	NI	NI	>90

III. PHYSICAL PROPERTIES

SPECIFIC GRAVITY (WATER =1)	NI	BOILING POINT, °F	NA
EVAP.RATE (BUTYL ACETATE=1)	NA	MELTING POINT, °F	NI
VAPOR PRESSURE, mmHg	NA	SOLUBILITY IN WATER	appreciable
VAPOR DENSITY (AIR=1)	NA	APPEARANCE	white powder
pH (AS IS)	NA	ODOR	none

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT, °F	None	FLAMMABLE LIMITS (AIR)	NA	LEL	NA	UEL

EXTINGUISHING MEDIA

[ ] Not Combustible [X] Water fog or spray [X] Carbon Dioxide [ ] Dry Chemical [ ] Alcohol Foam [ ] Foam [ ] Sand or Earth

SPECIAL FIRE FIGHTING PROCEDURES

Reaction with water may be highly exothermic.

UNUSUAL FIRE AND EXPLOSION HAZARDS

In the presence of water, material may react with amphoteric metals (such as aluminum, zinc, or tin) generating hydrogen gas which will burn or explode if ignited.

V. HEALTH HAZARD DATA

EFFECTS OF ACUTE EXPOSURE:

INHALATION: Dust may damage upper respiratory tract and lung tissue which may cause chemical pneumonia depending upon severity of exposure.

INGESTION: May be fatal. Causes burns to mouth, throat, esophagus and stomach.

SKIN: Can cause severe burns.

EYES: Causes severe burns with damage to eyes and possible blindness.

EFFECTS OF CHRONIC EXPOSURE:

None known.

CARCINOGEN: Not listed by NTP, IARC, OSHA

REFERENCE:

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove person from contaminated area. If breathing has stopped, resuscitate and administer oxygen if available.
Seek immediate medical attention.

INGESTION: Never give anything by mouth to an unconscious person, obtain immediate medical attention. If vomiting occurs spontaneously, keep airway clear. If swallowed DO NOT INDUCE VOMITING, give large amounts of water.
Seek immediate medical attention.

SKIN: Immediately wash contaminated skin with plenty of water for 15 minutes. Remove contaminated clothing and footwear. Wash clothing before reuse. Discard footwear if it cannot be decontaminated.
Seek immediate medical attention.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds of exposure is essential to minimize damage.
Seek immediate medical attention.

VI. PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL PROCEDURES:
Avoid contact with skin, eyes, and clothing. Wear protective equipment (See Section VII). Sweep or shovel spilled material into clean steel drum and cover. Flush spill area with copious amounts of water and neutralize residual traces. Dispose of in accordance with Local, State, and Federal regulations.

STORAGE AND HANDLING PRECAUTIONS:
Store in a cool, dry place. Keep away from acids and organic compounds. Loosen cover cautiously when opening.

ADDITIONAL INFORMATION:
Wash thoroughly after handling.

VII. CONTROL MEASURES

VENTILATION: Local exhaust recommended.

RESPIRATOR: Use NIOSH approved respirator when air concentration is greater than the TLV or PEL. Use cartridge filter for dusts.

EYE PROTECTION: [ ] Safety glasses [X] Chemical safety goggles [X] Face shield

PROTECTIVE GLOVES: [X] Neoprene [X] Natural rubber Other:

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:
Chemically resistant coveralls, hat, and shoes or boots.

WORK/HYGENIC PRACTICES:
Emergency eye wash and safety shower should be available. Wash thoroughly after handling.

ADDITIONAL INFORMATION:
For waste disposal of operating solutions consult Enthone-OMI Waste Disposal Procedures. For major spills consult Enthone-OMI for disposal assistance. Dispose of in accordance with Local, State, and Federal regulations.

CAS = Chemical Abstract Service
NI = No relevant information available
NA = Not applicable
Trade Secret = Claimed as allowed under 29 CFR 1910.1200
PEL = OSHA Permissible Exposure Limit
TLV = ACGIH Threshold Limit Value
NTP = National Toxicology Program
IARC = Int'l Agency for Research on Cancer

VIII. REACTIVITY DATA

X	Stable	CONDITIONS TO AVOID:	Stable under normal conditions. See Incompatibility information.
	Unstable		

INCOMPATABILITY (Materials to avoid): Acids, organic compounds.

HAZARDOUS DECOMPOSITION PRODUCTS: None known.

HAZARDOUS POLYMERIZATION		May occur	CONDITIONS TO AVOID: NA
	X	Will not occur	

IX. ADDITIONAL INFORMATION

This Material Safety Data Sheet may be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Enthone-OMI, Inc. furnishes the data contained herein in good faith at customer's request without liability or legal responsibility for same whatsoever, and no warranty or guarantee, express or implied, is made with respect to such data; nor does Enthone-OMI, Inc. grant permission, recommendation, or inducement to infringe any patent whether owned by Enthone-OMI, Inc. or others. The data is offered solely for your information and consideration. Since conditions of use are beyond Enthone-OMI's control, user assumes all responsibility and risk.

Enthone-OMI Inc.

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MATERIAL SAFETY DATA SHEET

ENTHONE

ENPREP™ 168E

P.O. BOX 1900
NEW HAVEN, CT 06508

(203) 934-8611

24 HOUR EMERGENCY PHONE NUMBERS
CHEMTREC 800-424-9300

NON-EMERGENCY PHONE NUMBERS

ENTHONE	203-934-8611
UDYLITE	313-497-9100
SEL-REX	313-497-9100

PRODUCT CODE#: 2118
DATE ISSUED: 10/4/93
SUPERCEDES: 1/17/92 (Enbond HD-168)
PREPARER: L.T. Horbal

II. HAZARDOUS INGREDIENTS

COMPONENT	COMMON NAME	CAS NO.	OSHA-PEL	ACGIH-TLV	%
Sodium hydroxide	Caustic soda	1310-73-2	2mg/m3	2mg/m3	<45
Sodium metasilicate		6834-92-0	2mg/m3	2mg/m3	<10
Triethanolamine	TEA	102-71-6	NI	3.1mg/m3	<5

III. PHYSICAL PROPERTIES

SPECIFIC GRAVITY (WATER =1)	NI	BOILING POINT, °F	NA
EVAP.RATE (BUTYL ACETATE=1)	NA	MELTING POINT, °F	NI
VAPOR PRESSURE, mmHg	NA	SOLUBILITY IN WATER	essentially complete
VAPOR DENSITY (AIR=1)	NA	APPEARANCE	off-white powder
pH (AS IS)	NA	ODOR	caustic

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT, °F	NA	FLAMMABLE LIMITS (AIR)	NA	LEL	NA	UEL

EXTINGUISHING MEDIA

[X] Not Combustible [ ] Water fog or spray [ ] Carbon Dioxide [ ] Dry Chemical [ ] Alcohol Foam [ ] Foam [ ] Sand or Earth

SPECIAL FIRE FIGHTING PROCEDURES

Reaction with water may be highly exothermic.

UNUSUAL FIRE AND EXPLOSION HAZARDS

In the presence of water, material may react with amphoteric metals (such as aluminum, zinc, or tin) generating hydrogen gas which will burn or explode if ignited.

V. HEALTH HAZARD DATA

EFFECTS OF ACUTE EXPOSURE:

INHALATION: Dust may damage upper respiratory tract and lung tissue which may cause chemical pneumonia depending upon severity of exposure.

INGESTION: Can cause severe burns to mouth, esophagus and stomach.

SKIN: Can cause severe burns.

EYES: Causes severe burns with damage to eyes and possible blindness.

EFFECTS OF CHRONIC EXPOSURE:

Superficial destruction of skin or primary irritant dermatitis. Inhalation of dust may result in irritation or damage to respiratory tract tissue and increased susceptibility to respiratory illness.

CARCINOGEN: Not listed by NTP, IARC, OSHA.

REFERENCE:

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove person from contaminated area. If breathing has stopped, resuscitate and administer oxygen if available.
Seek immediate medical attention.

INGESTION: Never give anything by mouth to an unconscious person, obtain immediate medical attention. If vomiting occurs spontaneously, keep airway clear. If swallowed DO NOT INDUCE VOMITING, give large amounts of water.
Seek immediate medical attention.

SKIN: Immediately wash contaminated skin with plenty of water for 15 minutes. Remove contaminated clothing and footwear. Wash clothing before reuse. Discard footwear if it cannot be decontaminated.
Seek immediate medical attention.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds of exposure is essential to minimize damage.
Seek immediate medical attention.

VI. PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL PROCEDURES:

Avoid contact with skin, eyes and clothing. Wear protective equipment (See Section VII). Sweep or shovel spilled material into clean steel drum and cover. Flush spill area with copious amounts of water and neutralize residual traces with dilute acid such as dilute acetic acid. Dispose of in accordance with Local, State and Federal regulations.

STORAGE AND HANDLING PRECAUTIONS:

Store in a cool, dry place. Keep away from acids and organic compounds. Loosen cover cautiously when opening.

ADDITIONAL INFORMATION:

Wash thoroughly after handling.

VII. CONTROL MEASURES

VENTILATION: Local exhaust recommended.

RESPIRATOR: Use NIOSH approved respirator when air concentration is greater than the TLV or PEL. Use cartridge filter for caustic dust.

EYE PROTECTION: [X] Safety glasses [ ] Chemical safety goggles [X] Face shield

PROTECTIVE GLOVES: [X] Neoprene [ ] Natural rubber Other:

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:

Chemically resistant coveralls, hat, and shoes or boots.

WORK/HYGENIC PRACTICES:

Emergency eye wash and safety shower should be available. Wash thoroughly after handling.

ADDITIONAL INFORMATION:

For waste disposal of spilled or contaminated product follow Enthone-OMI Waste Disposal Procedures. If necessary, consult Enthone-OMI for disposal assistance. Dispose of in accordance with Local, State and Federal regulations.

CAS = Chemical Abstract Service
NI = No relevant information available
NA = Not applicable
Trade Secret = Claimed as allowed under 29 CFR 1910.1200
PEL = OSHA Permissible Exposure Limit
TLV = ACGIH Threshold Limit Value
NTP = National Toxicology Program
IARC = Int'l Agency for Research on Cancer

VIII. REACTIVITY DATA

X	Stable	CONDITIONS TO AVOID:	Stable under normal conditions. See Incompatibility information.
	Unstable		

INCOMPATABILITY (Materials to avoid): Acids, amphoteric metals (such as aluminum, zinc), organic compounds, heated water.

HAZARDOUS DECOMPOSITION PRODUCTS: None known.

HAZARDOUS POLYMERIZATION		May occur	CONDITIONS TO AVOID: NA
	X	Will not occur	

IX. ADDITIONAL INFORMATION

This product does not contain any chemicals subject to the reporting requirements of SARA, TITLE III, Section 313 (40CFR372) or known to the State of California to cause cancer or birth defects (to comply with California Statute [Section 25249.6]).

Enthone-OMI Inc.

a subsidiary of ASARCO

MATERIAL SAFETY DATA SHEET

ENTHONE

ENTHOBRITE® Q-563

P.O. BOX 1900
NEW HAVEN, CT 06508

(203) 934-8611

24 HOUR EMERGENCY PHONE NUMBERS
CHEMTREC 800-424-9300

NON-EMERGENCY PHONE NUMBERS

ENTHONE	203-934-8611
UDYLITE	313-497-9100
SEL-REX	313-497-9100

PRODUCT CODE#: 4101
DATE ISSUED: 5/14/92
SUPERCEDES: 3/16/90
PREPARER: B.A. Whalen/S.D. Koch SDK

II. HAZARDOUS INGREDIENTS

COMPONENT	COMMON NAME	CAS NO.	OSHA-PEL	ACGIH-TLV	%
Water		7732-18-5	NI	NI	>75
Sodium bisulfite		7681-57-4	5mg/m3	5mg/m3	<5
Anisic aldehyde		123-11-5	NI	NI	<5

Balance of materials not known to be hazardous

III. PHYSICAL PROPERTIES

SPECIFIC GRAVITY (WATER =1)	1.085	BOILING POINT, °F	ca. 280
EVAP.RATE (BUTYL ACETATE=1)	NI	MELTING POINT, °F	NI
VAPOR PRESSURE, mmHg	NI	SOLUBILITY IN WATER	complete
VAPOR DENSITY (AIR=1)	NI	APPEARANCE	dark brown liquid
pH (AS IS)	ca. 5.2	ODOR	sweet

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT, °F	None	FLAMMABLE LIMITS (AIR)	NA	LEL	NA	UEL

EXTINGUISHING MEDIA

[ ] Not Combustible [X] Water fog or spray [X] Carbon Dioxide [ ] Dry Chemical [ ] Alcohol Foam [X] Foam [ ] Sand or Earth

SPECIAL FIRE FIGHTING PROCEDURES

Wear NIOSH approved full protective clothing and self-contained breathing apparatus. Keep containers cool to prevent rupture and release of material.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Material is non-combustible, however if involved in a fire may give off formaldehyde, phosgene, toxic sulfur and nitrogen oxides, carbon monoxide, carbon dioxide, misc. hydrocarbons.

V. HEALTH HAZARD DATA

EFFECTS OF ACUTE EXPOSURE:

INHALATION: Mist or vapor may irritate respiratory tract.

INGESTION: Can cause irritation to mouth, throat, esophagus, and stomach.

SKIN: Can cause irritation.

EYES: Can cause severe irritation, damage to eyes.

EFFECTS OF CHRONIC EXPOSURE:

Chronic exposure effects not established.

CARCINOGEN: Not listed by NTP, IARC, OSHA

REFERENCE:

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove person from contaminated area. If breathing has stopped, resuscitate and administer oxygen if available.
Seek immediate medical attention.

INGESTION: Never give anything by mouth to an unconscious person, obtain immediate medical attention. If vomiting occurs spontaneously, keep airway clear. If swallowed DO NOT INDUCE VOMITING, give large amounts of water.
Seek immediate medical attention.

SKIN: Immediately wash contaminated skin with plenty of water for 15 minutes. Remove contaminated clothing and footwear. Wash clothing before reuse. Discard footwear if it cannot be decontaminated.
Seek immediate medical attention.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds of exposure is essential to minimize damage.
Seek immediate medical attention.

VI. PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL PROCEDURES:
Avoid contact with skin, eyes, and clothing. Wear protective equipment (see Section VII). Do not breathe mist or vapors. Contain spill and soak up in suitable absorbent. Shovel up into plastic-lined steel containers and cover. Dispose of in accordance with Local, State, and Federal regulations.

STORAGE AND HANDLING PRECAUTIONS:
Store in a cool, dry place. Keep away from oxidizers. Loosen cover cautiously when opening.

ADDITIONAL INFORMATION:
Wash thoroughly after handling.

VII. CONTROL MEASURES

VENTILATION: Local exhaust recommended.

RESPIRATOR: Use NIOSH approved respirator when air concentration is greater than the TLV or PEL. Use cartridge filter for organic vapors.

EYE PROTECTION: [ ] Safety glasses [X] Chemical safety goggles [X] Face shield

PROTECTIVE GLOVES: [X] Neoprene [X] Natural rubber Other:

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:
Chemically resistant coveralls, hat, and shoes or boots.

WORK/HYGENIC PRACTICES:
Emergency eye wash and safety shower should be available. Wash thoroughly after handling.

ADDITIONAL INFORMATION:
For waste disposal of operating solutions consult Enthone-OMI Waste Disposal Procedures. For major spills consult Enthone-OMI for disposal assistance. Dispose of in accordance with Local, State, and Federal regulations.

CAS = Chemical Abstract Service
NI = No relevant information available
NA = Not applicable
Trade Secret = Claimed as allowed under 29 CFR 1910.1200
PEL = OSHA Permissible Exposure Limit
TLV = ACGIH Threshold Limit Value
NTP = National Toxicology Program
IARC = Int'l Agency for Research on Cancer

VIII. REACTIVITY DATA

X	Stable	CONDITIONS TO AVOID:	Stable under normal conditions. See Incompatibility information.
	Unstable		

INCOMPATABILITY (Materials to avoid): Oxidizers, excessive heat.

HAZARDOUS DECOMPOSITION PRODUCTS: Toxic phosgene and oxides of nitrogen, sulfur and carbon, miscellaneous hydrocarbons, formaldehyde.

HAZARDOUS POLYMERIZATION		May occur	CONDITIONS TO AVOID: NA
	X	Will not occur	

IX. ADDITIONAL INFORMATION

This product does not contain any chemicals subject to the reporting requirements of SARA, TITLE III, Section 313 (40CFR372) or known to the State of California to cause cancer or birth defects (to comply with California Statute [Section 25249.6]).

Enthone-OMI Inc.

_____ a subsidiary of ASARCO

MATERIAL SAFETY DATA SHEET

ENTHONE

ACTANE® 32

P.O. BOX 1900
NEW HAVEN, CT 06508

(203) 934-8611

24 HOUR EMERGENCY PHONE NUMBERS
CHEMTREC 800-424-9300

NON-EMERGENCY PHONE NUMBERS

ENTHONE	203-934-8611
UDYLITE	313-497-9100
SEL-REX	313-497-9100

PRODUCT CODE#: 2735
DATE ISSUED: 2/19/92
SUPERCEDES: 5/4/90
PREPARER: B.A. Whalen/S.D. Koch

SDK

II. HAZARDOUS INGREDIENTS

COMPONENT	COMMON NAME	CAS NO.	OSHA-PEL	ACGIH-TLV	%
Water		7732-18-5	NI	NI	>90
Butynediol-1,4		110-65-6	NI	NI	>1

III. PHYSICAL PROPERTIES

SPECIFIC GRAVITY (WATER =1)	1.014	BOILING POINT, °F	212
EVAP.RATE (BUTYL ACETATE=1)	NA	MELTING POINT, °F	NI
VAPOR PRESSURE, mmHg	NA	SOLUBILITY IN WATER	complete
VAPOR DENSITY (AIR=1)	NA	APPEARANCE	light yellow liquid
pH (AS IS)	7	ODOR	soap-like

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT, °F	NA	FLAMMABLE LIMITS (AIR)	NA	LEL	NA	UEL

EXTINGUISHING MEDIA

[X] Not Combustible [X] Water fog or spray [X] Carbon Dioxide [ ] Dry Chemical [ ] Alcohol Foam [X] Foam [ ] Sand or Earth

SPECIAL FIRE FIGHTING PROCEDURES

Wear NIOSH approved full protective clothing and self-contained breathing apparatus. Keep containers cool to prevent rupture and release of material.

UNUSUAL FIRE AND EXPLOSION HAZARDS

None known.

VI. PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL PROCEDURES:

Avoid contact with skin, eyes, and clothing. Wear protective equipment (see Section VII). Do not breathe mist or vapors. Contain spill and soak up in suitable absorbent. Shovel up into plastic-lined steel containers and cover. Dispose of in accordance with Local, State, and Federal regulations.

STORAGE AND HANDLING PRECAUTIONS:

Store in a cool, dry place. Keep away from acids and oxidizers. Loosen cover cautiously when opening.

ADDITIONAL INFORMATION:

Wash thoroughly after handling.

VII. CONTROL MEASURES

VENTILATION: Local exhaust recommended.

RESPIRATOR: Use NIOSH approved respirator when air concentration is greater than the TLV or PEL. Use cartridge filter for organic vapors.

EYE PROTECTION: [ ] Safety glasses [X] Chemical safety goggles [X] Face shield

PROTECTIVE GLOVES: [X] Neoprene [X] Natural rubber Other:

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:

Chemically resistant coveralls, hat, and shoes or boots.

WORK/HYGENIC PRACTICES:

Emergency eye wash and safety shower should be available. Wash thoroughly after handling.

ADDITIONAL INFORMATION:

For waste disposal of spilled or contaminated product follow Enthone-OMI Waste Disposal Procedures. If necessary, consult Enthone-OMI for disposal assistance. Dispose of in accordance with Local, State and Federal regulations.

CAS = Chemical Abstract Service
NI = No relevant information available
NA = Not applicable
Trade Secret = Claimed as allowed under 29 CFR 1910.1200
PEL = OSHA Permissible Exposure Limit
TLV = ACGIH Threshold Limit Value
NTP = National Toxicology Program
IARC = Int'l Agency for Research on Cancer

V. HEALTH HAZARD DATA

EFFECTS OF ACUTE EXPOSURE:

INHALATION: Mist or vapor may irritate respiratory tract.

INGESTION: Can cause irritation to mouth, throat, esophagus, and stomach.

SKIN: Can cause irritation.

EYES: Can cause severe irritation, damage to eyes.

EFFECTS OF CHRONIC EXPOSURE:

General discomfort, irritation and possible sensitization.

CARCINOGEN: Not listed by NTP, IARC, OSHA.

REFERENCE:

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove person from contaminated area. If breathing has stopped, resuscitate and administer oxygen if available.
Seek immediate medical attention.

INGESTION: Never give anything by mouth to an unconscious person, obtain immediate medical attention. If vomiting occurs spontaneously, keep airway clear. If swallowed give large amounts of water and INDUCE VOMITING.
Seek immediate medical attention.

SKIN: Immediately wash contaminated skin with plenty of water. Remove contaminated clothing and footwear. Wash clothing before reuse. Discard footwear if it cannot be decontaminated. If irritation continues, seek medical attention.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds of exposure is essential to minimize damage.
Seek immediate medical attention.

VIII. REACTIVITY DATA

X	Stable	CONDITIONS TO AVOID:	Stable under normal conditions. See Incompatibility information.
	Unstable		

INCOMPATABILITY (Materials to avoid): Oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS: Small amounts of carbon monoxide, carbon dioxide; traces of toxic oxides of sulfur.

HAZARDOUS POLYMERIZATION		May occur	CONDITIONS TO AVOID: NA
	X	Will not occur	

IX. ADDITIONAL INFORMATION

Enthone-OMI, Inc.

a subsidiary of ASARCO

MATERIAL SAFETY DATA SHEET

ENTHONE

ENTHOBRITE® EXTENDER 153

P.O. BOX 1900
NEW HAVEN, CT 06508

(203) 934-8611

24 HOUR EMERGENCY PHONE NUMBERS
CHEMTREC 800-424-9300

NON-EMERGENCY PHONE NUMBERS

ENTHONE	203-934-8611
UDYLITE	313-497-9100
SEL-REX	313-497-9100

PRODUCT CODE#: 4590
DATE ISSUED: 11/9/87
SUPERCEDES: 7/84
PREPARER: F.R. Hirtler FRH/SDK

II. HAZARDOUS INGREDIENTS

COMPONENT	COMMON NAME	CAS NO.	OSHA-PEL	ACGIH-TLV	%

No known hazardous ingredients present.

III. PHYSICAL PROPERTIES

SPECIFIC GRAVITY (WATER =1)	1.147	BOILING POINT, °F	210
EVAP.RATE (BUTYL ACETATE=1)	NI	MELTING POINT, °F	32
VAPOR PRESSURE, mmHg	NI	SOLUBILITY IN WATER	complete
VAPOR DENSITY (AIR=1)	NI	APPEARANCE	amber liquid
pH (AS IS)	ca. 6.4	ODOR	pungent

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT, °F	None	FLAMMABLE LIMITS (AIR)	NA	LEL	NA	UEL

EXTINGUISHING MEDIA

[ ] Not Combustible [X] Water fog or spray [X] Carbon Dioxide [ ] Dry Chemical [ ] Alcohol Foam [X] Foam [ ] Sand or Earth

SPECIAL FIRE FIGHTING PROCEDURES

Wear NIOSH approved full protective clothing and self-contained breathing apparatus. Keep containers cool to prevent rupture and release of material.

UNUSUAL FIRE AND EXPLOSION HAZARDS

When exposed to high temperatures, dried product may release toxic oxides of nitrogen and carbon.

V. HEALTH HAZARD DATA

EFFECTS OF ACUTE EXPOSURE:

INHALATION: Mist or vapor may irritate respiratory tract.

INGESTION: Can cause irritation to mouth, throat, esophagus, and stomach.

SKIN: Can cause irritation.

EYES: Can cause irritation.

EFFECTS OF CHRONIC EXPOSURE:

Chronic exposure effects not established.

CARCINOGEN: Not listed by NTP, IARC, OSHA

REFERENCE:

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove person from contaminated area. If breathing has stopped, resuscitate and administer oxygen if available.
Seek immediate medical attention.

INGESTION: Never give anything by mouth to an unconscious person, obtain immediate medical attention. If vomiting occurs spontaneously, keep airway clear. If swallowed give large amounts of water and INDUCE VOMITING.
Seek immediate medical attention.

SKIN: Immediately wash contaminated skin with plenty of water for 15 minutes. Remove contaminated clothing and footwear. Wash clothing before reuse. Discard footwear if it cannot be decontaminated.
Seek immediate medical attention.

EYES: Flush eyes with plenty of water, holding lids apart to ensure flushing of entire surface to prevent or relieve irritation.
If irritation persists, seek medical attention.

VI. PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL PROCEDURES:

Avoid contact with skin, eyes, and clothing. Wear protective equipment (see Section VII). Do not breathe mist or vapors. Contain spill and soak up in suitable absorbent. Shovel up into plastic-lined steel containers and cover. Dispose of in accordance with Local, State, and Federal regulations.

STORAGE AND HANDLING PRECAUTIONS:

Store in a cool, dry place. Keep away from oxidizers. Loosen cover cautiously when opening.

ADDITIONAL INFORMATION:

Store above freezing temperature.

VII. CONTROL MEASURES

VENTILATION: Local exhaust recommended.

RESPIRATOR: Use NIOSH approved respirator when air concentration is greater than the TLV or PEL. Use cartridge filter for organic vapors.

EYE PROTECTION: [ ] Safety glasses [X] Chemical safety goggles [X] Face shield

PROTECTIVE GLOVES: [X] Neoprene [X] Natural rubber Other:

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:

Chemically resistant coveralls, hat, and shoes or boots.

WORK/HYGENIC PRACTICES:

Emergency eye wash and safety shower should be available. Wash thoroughly after handling.

ADDITIONAL INFORMATION:

For waste disposal of operating solutions consult Enthone-OMI Waste Disposal Procedures. For major spills consult Enthone-OMI for disposal assistance. Dispose of in accordance with Local, State, and Federal regulations.

CAS = Chemical Abstract Service
NI = No relevant information available
NA = Not applicable
Trade Secret = Claimed as allowed under 29 CFR 1910.1200
PEL = OSHA Permissible Exposure Limit
TLV = ACGIH Threshold Limit Value
NTP = National Toxicology Program
IARC = Int'l Agency for Research on Cancer

:TIVITY DATA

CONDITIONS TO AVOID:	Stable under normal conditions. See Incompatibility information.
3ILITY (Materials to avoid):	Oxidizers
DECOMPOSITION PRODUCTS:	Toxic oxides of nitrogen and carbon, miscellaneous hydrocarbons.

S ZATION		May occur	CONDITIONS TO AVOID: NA
	X	Will not occur	

DITIONAL INFORMATION

Enthone-OMI, Inc.

a subsidiary of ASARCO

MATERIAL SAFETY DATA SHEET

ENTHONE

ENTHOBRITE® EXTENDER 253

P.O. BOX 1900
NEW HAVEN, CT 06508

(203) 934-8611

24 HOUR EMERGENCY PHONE NUMBERS
CHEMTREC 800-424-9300

NON-EMERGENCY PHONE NUMBERS

ENTHONE	203-934-8611
UDYLITE	313-497-9100
SEL-REX	313-497-9100

PRODUCT CODE#: 4591
DATE ISSUED: 2/27/91
SUPERCEDES: 11/19/87
PREPARER: S.D. Koch

SDK

II. HAZARDOUS INGREDIENTS

COMPONENT	COMMON NAME	CAS NO.	OSHA-PEL	ACGIH-TLV	%
Water		7732-18-5	NI	NI	>80
Sodium chloride	Salt	7647-14-5	NI	NI	<5
Mixture of quaternary nitrogen compounds.		Trade secret	NI	NI	<20

III. PHYSICAL PROPERTIES

SPECIFIC GRAVITY (WATER =1)	1.064	BOILING POINT, °F	212
EVAP.RATE (BUTYL ACETATE=1)	NI	MELTING POINT, °F	28
VAPOR PRESSURE, mmHg	NI	SOLUBILITY IN WATER	complete
VAPOR DENSITY (AIR=1)	NI	APPEARANCE	brown liquid
pH (AS IS)	5.2	ODOR	fruity

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT, °F	None	FLAMMABLE LIMITS (AIR)	NA	LEL	NA	UEL

EXTINGUISHING MEDIA

[ ] Not Combustible [X] Water fog or spray [X] Carbon Dioxide [ ] Dry Chemical [ ] Alcohol Foam [X] Foam [ ] Sand or Earth

SPECIAL FIRE FIGHTING PROCEDURES

Wear NIOSH approved full protective clothing and self-contained breathing apparatus. Keep containers cool to prevent rupture and release of material.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Product is non-combustible, however, if involved in a fire may release toxic oxides of carbon and nitrogen.

V. HEALTH HAZARD DATA

EFFECTS OF ACUTE EXPOSURE:

INHALATION: Mist or vapor may irritate respiratory tract.

INGESTION: Can cause irritation to mouth, throat, esophagus, and stomach.

SKIN: Can cause irritation.

EYES: Can cause irritation.

EFFECTS OF CHRONIC EXPOSURE:

Chronic exposure effects not established.

CARCINOGEN: Not listed by NTP, IARC, OSHA

REFERENCE:

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove person from contaminated area. If breathing has stopped, resuscitate and administer oxygen if available.
Seek immediate medical attention.

INGESTION: Never give anything by mouth to an unconscious person, obtain immediate medical attention. If vomiting occurs spontaneously, keep airway clear. If swallowed DO NOT INDUCE VOMITING, give large amounts of water.
Seek immediate medical attention.

SKIN: Immediately wash contaminated skin with plenty of soap and water. Remove contaminated clothing and footwear. Wash clothing before reuse. Discard footwear. If irritation continues, seek medical attention.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds of exposure is essential to minimize damage.
Seek immediate medical attention.

VI. PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL PROCEDURES:
Avoid contact with skin, eyes, and clothing. Wear protective equipment (see Section VII). Do not breathe mist or vapors. Contain spill and soak up in suitable absorbent. Shovel up into plastic-lined steel containers and cover. Dispose of in accordance with Local, State, and Federal regulations.

STORAGE AND HANDLING PRECAUTIONS:
Store in a cool, dry place. Keep away from oxidizers. Loosen cover cautiously when opening.

ADDITIONAL INFORMATION:
Store above freezing temperature.

VII. CONTROL MEASURES

VENTILATION: Local exhaust recommended.

RESPIRATOR: Use NIOSH approved respirator when air concentration is greater than the TLV or PEL. Use cartridge filter for organic vapors.

EYE PROTECTION: [ ] Safety glasses [X] Chemical safety goggles [X] Face shield

PROTECTIVE GLOVES: [X] Neoprene [X] Natural rubber Other:

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:
Chemically resistant coveralls, hat, and shoes or boots.

WORK/HYGENIC PRACTICES:
Emergency eye wash and safety shower should be available. Wash thoroughly after handling.

ADDITIONAL INFORMATION:
For waste disposal of spilled or contaminated product follow Enthone-OMI Waste Disposal Procedures. If necessary, consult Enthone-OMI for disposal assistance. Dispose of in accordance with Local, State and Federal regulations.

CAS = Chemical Abstract Service
NI = No relevant information available
NA = Not applicable
Trade Secret = Claimed as allowed under 29 CFR 1910.1200
PEL = OSHA Permissible Exposure Limit
TLV = ACGIH Threshold Limit Value
NTP = National Toxicology Program
IARC = Int'l Agency for Research on Cancer

VIII. REACTIVITY DATA

X	Stable	CONDITIONS TO AVOID:	Stable under normal conditions. See Incompatibility information.
	Unstable		

INCOMPATABILITY (Materials to avoid): Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Toxic oxides of carbon and nitrogen.

HAZARDOUS POLYMERIZATION		May occur	CONDITIONS TO AVOID: NA
	X	Will not occur	

IX. ADDITIONAL INFORMATION

This Material Safety Data Sheet may be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Enthone-OMI, Inc. furnishes the data contained herein in good faith at customer's request without liability or legal responsibility for same whatsoever, and no warranty or guarantee, express or implied, is made with respect to such data; nor does Enthone-OMI, Inc. grant permission, recommendation, or inducement to infringe any patent whether owned by Enthone-OMI, Inc. or others. The data is offered solely for your information and consideration. Since conditions of use are beyond Enthone-OMI's control, user assumes all responsibility and risk.

Enthone-OMI, Inc.

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MATERIAL SAFETY DATA SHEET

ENTHONE

ENTHOBRITE® CNZ CLARIFIER

P.O. BOX 1900
NEW HAVEN, CT 06508

(203) 934-8611

24 HOUR EMERGENCY PHONE NUMBERS
CHEMTREC 800-424-9300 (Transportation)
MFSA 313-644-5626
NON-EMERGENCY PHONE NUMBERS
ENTHONE 203-934-8611
UDYLITE 313-497-9100
SEL-REX 313-497-9100

PRODUCT CODE#: 4200
DATE ISSUED: 11/19/87
SUPERCEDES: 12/19/87
PREPARER: F.R. Hirtler

FRH/sdk

II. HAZARDOUS INGREDIENTS

COMPONENT	COMMON NAME	CAS NO.	OSHA-PEL	ACGIH-TLV	%
No known hazardous ingredients present.					

III. PHYSICAL PROPERTIES

SPECIFIC GRAVITY (WATER =1)	1.08	BOILING POINT, °F	212
EVAP.RATE (BUTYL ACETATE=1)	NI	MELTING POINT, °F	NI
VAPOR PRESSURE, mmHg	NI	SOLUBILITY IN WATER	complete
VAPOR DENSITY (AIR=1)	NI	APPEARANCE	yellow-orange liquid
pH (AS IS)	4.3	ODOR	insignificant

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT, °F	None	FLAMMABLE LIMITS (AIR)	NA	LEL	NA	UEL

EXTINGUISHING MEDIA

[ ] Not Combustible [X] Water fog or spray [X] Carbon Dioxide [ ] Dry Chemical [ ] Alcohol Foam [X] Foam [ ] Sand or Earth

SPECIAL FIRE FIGHTING PROCEDURES

Wear NIOSH approved full protective clothing and self-contained breathing apparatus. Keep containers cool to prevent rupture and release of material.

UNUSUAL FIRE AND EXPLOSION HAZARDS

None known.

V. HEALTH HAZARD DATA

EFFECTS OF ACUTE EXPOSURE:

INHALATION: Mist or vapor may irritate respiratory tract.

INGESTION: Can cause irritation to mouth, throat, esophagus, and stomach.

SKIN: Can cause skin irritation and dermatitis.

EYES: Can cause severe irritation.

EFFECTS OF CHRONIC EXPOSURE:

Chronic exposure effects not established.

CARCINOGEN: Not listed by NTP, IARC, OSHA

REFERENCE:

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove person from contaminated area. If breathing has stopped, resuscitate and administer oxygen if available.
Seek immediate medical attention.

INGESTION: Never give anything by mouth to an unconscious person, obtain immediate medical attention. If vomiting occurs spontaneously, keep airway clear. If swallowed DO NOT INDUCE VOMITING, give large amounts of water.
Seek immediate medical attention.

SKIN: Immediately wash contaminated skin with plenty of water. Remove contaminated clothing and footwear. Wash clothing before reuse. Discard footwear if it cannot be decontaminated. If irritation continues seek medical attention.

EYES: Flush eyes with plenty of water, holding lids apart to ensure flushing of entire surface to prevent or relieve irritation.
If irritation persists, seek medical attention.

VI. PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL PROCEDURES:
Avoid contact with skin, eyes, and clothing. Wear protective equipment (see Section VII). Do not breathe mist or vapors. Contain spill and soak up in suitable absorbent. Shovel up into plastic-lined steel containers and cover. Dispose of in accordance with Local, State, and Federal regulations.

STORAGE AND HANDLING PRECAUTIONS:
Store in a cool, dry place. Keep away from alkalies and oxidizers. Loosen cover cautiously when opening.

ADDITIONAL INFORMATION:
Store above freezing temperature.

VII. CONTROL MEASURES

VENTILATION: Local exhaust recommended.

RESPIRATOR: Use NIOSH approved respirator when air concentration is greater than the TLV or PEL.
Not normally required

EYE PROTECTION: [X] Safety glasses [X] Chemical safety goggles [ ] Face shield

PROTECTIVE GLOVES: [X] Neoprene [X] Natural rubber Other:

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:
Chemically resistant coveralls, hat, and shoes or boots.

WORK/HYGENIC PRACTICES:
Emergency eye wash and safety shower should be available. Wash thoroughly after handling.

ADDITIONAL INFORMATION:
For waste disposal of operating solutions consult Enthone-OMI Waste Disposal Procedures. For major spills consult Enthone-OMI for disposal assistance. Dispose of in accordance with Local, State, and Federal regulations.

CAS = Chemical Abstract Service
NI = No relevant information available
NA = Not applicable
Trade Secret = Claimed as allowed under 29 CFR 1910.1200
PEL = OSHA Permissible Exposure Limit
TLV = ACGIH Threshold Limit Value
NTP = National Toxicology Program
IARC = Int'l Agency for Research on Cancer

VIII. REACTIVITY DATA

X	Stable	CONDITIONS TO AVOID:	Excessive heat
	Unstable		

INCOMPATABILITY (Materials to avoid): Alkalis and oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS: Toxic oxides of carbon; miscellaneous hydrocarbons.

HAZARDOUS POLYMERIZATION		May occur	CONDITIONS TO AVOID: NA
	X	Will not occur	

IX. ADDITIONAL INFORMATION

This Material Safety Data Sheet may be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Enthone-OMI, Inc. furnishes the data contained herein in good faith at customer's request without liability or legal responsibility for same whatsoever, and no warranty or guarantee, express or implied, is made with respect to such data; nor does Enthone-OMI, Inc. grant permission, recommendation, or inducement to infringe any patent whether owned by Enthone-OMI, Inc. or others. The data is offered solely for your information and consideration. Since conditions of use are beyond Enthone-OMI's control, user assumes all responsibility and risk.

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MATERIAL SAFETY DATA SHEET

ENTHONE

CHROMEKILL ENTEK® 6A

P.O. BOX 1900
NEW HAVEN, CT 06508

(203) 934-8611

24 HOUR EMERGENCY PHONE NUMBERS
CHEMTREC 800-424-9300

NON-EMERGENCY PHONE NUMBERS

ENTHONE	203-934-8611
UDYLITE	313-497-9100
SEL-REX	313-497-9100

PRODUCT CODE#: 2902
DATE ISSUED: 5/7/93
SUPERCEDES: 5/7/90 (Chromekill 6A)
PREPARER: L.T. Horbal

II. HAZARDOUS INGREDIENTS

COMPONENT	COMMON NAME	CAS NO.	OSHA-PEL	ACGIH-TLV	%
Sodium sulfite		7757-83-7	NI	NI	>75
Sodium hydrosulfite	Sodium dithionite	7775-14-6	NI	NI	>15

III. PHYSICAL PROPERTIES

SPECIFIC GRAVITY (WATER =1)	NI	BOILING POINT, °F	NA
EVAP.RATE (BUTYL ACETATE=1)	NA	MELTING POINT, °F	NI
VAPOR PRESSURE, mmHg	NA	SOLUBILITY IN WATER	essentially soluble
VAPOR DENSITY (AIR=1)	NA	APPEARANCE	white powder
pH (AS IS)	NA	ODOR	slight sulfur-like

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT, °F	NA	FLAMMABLE LIMITS (AIR)	NA	LEL	NA	UEL

EXTINGUISHING MEDIA

[ ] Not Combustible [X] Water fog or spray [ ] Carbon Dioxide [ ] Dry Chemical [ ] Alcohol Foam [ ] Foam [ ] Sand or Earth

SPECIAL FIRE FIGHTING PROCEDURES

Wear self-contained breathing apparatus (SCBA) and complete personal protective equipment when potential for exposure to vapors or products of combustion exists. Deluge with water because product contains its own oxygen supply.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Exposure temperatures above 125°F may generate toxic oxides of sulfur and sodium oxide. Material is classified as a "flammable solid" by U.S.D.O.T.

V. HEALTH HAZARD DATA

EFFECTS OF ACUTE EXPOSURE:

INHALATION: Dust may damage upper respiratory tract and lung tissue which may cause chemical pneumonia depending upon severity of exposure.

INGESTION: Can cause burns to mouth, throat, esophagus, and stomach.

SKIN: Can cause burns.

EYES: Can cause severe irritation, damage to eyes.

EFFECTS OF CHRONIC EXPOSURE:

Nausea, vomiting, disturbances of the digestive tract, chrome sores, bone fluorosis and possibly osteosclerosis and lung cancer.

CARCINOGEN: Not listed by NTP, IARC, OSHA

REFERENCE:

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove person from contaminated area. If breathing has stopped, resuscitate and administer oxygen if available.
Seek immediate medical attention.

INGESTION: Never give anything by mouth to an unconscious person, obtain immediate medical attention. If vomiting occurs spontaneously, keep airway clear. If swallowed DO NOT INDUCE VOMITING, give large amounts of water.
Seek immediate medical attention.

SKIN: Immediately wash contaminated skin with plenty of water for 15 minutes. Remove contaminated clothing and footwear. Wash clothing before reuse. Discard footwear if it cannot be decontaminated.
Seek immediate medical attention.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds of exposure is essential to minimize damage.
Seek immediate medical attention.

VI. PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL PROCEDURES:
Avoid contact with skin, eyes, and clothing. Wear protective equipment (See section VII). Sweep or shovel spilled material into clean plastic lined container and cover. Flush spill area with copious amounts of water. Dispose of in accordance with Local, State and Federal regulations.

STORAGE AND HANDLING PRECAUTIONS:
Store in a cool, dry place. Keep away from acids and oxidizers. Loosen cover cautiously when opening.

ADDITIONAL INFORMATION:
Wash thoroughly after handling.

VII. CONTROL MEASURES

VENTILATION: Local exhaust recommended.

RESPIRATOR: Use NIOSH approved respirator when air concentration is greater than the TLV or PEL. Use cartridge filter for dusts.

EYE PROTECTION: [ ] Safety glasses [X] Chemical safety goggles [X] Face shield

PROTECTIVE GLOVES: [X] Neoprene [X] Natural rubber Other:

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:
Chemically resistant coveralls, hat, and shoes or boots.

WORK/HYGENIC PRACTICES:
Emergency eye wash and safety shower should be available. Wash thoroughly after handling.

ADDITIONAL INFORMATION:
For waste disposal of operating solutions consult Enthone-OMI Waste Disposal Procedures. For major spills consult Enthone-OMI for disposal assistance. Dispose of in accordance with Local, State, and Federal regulations.

CAS = Chemical Abstract Service
NI = No relevant information available
NA = Not applicable
Trade Secret = Claimed as allowed under 29 CFR 1910.1200
PEL = OSHA Permissible Exposure Limit
TLV = ACGIH Threshold Limit Value
NTP = National Toxicology Program
IARC = Int'l Agency for Research on Cancer

VIII. REACTIVITY DATA

X	Stable	CONDITIONS TO AVOID:	Moisture
	Unstable		

INCOMPATABILITY (Materials to avoid): Oxidizing agents, acids, acid salts.

HAZARDOUS DECOMPOSITION PRODUCTS: Decomposes in water generating sulfur dioxide, sulfur trioxide, sodium sulfite, sodium thiosulfite, flammable sodium sulfide.

HAZARDOUS POLYMERIZATION		May occur	CONDITIONS TO AVOID: NA
	X	Will not occur	

IX. ADDITIONAL INFORMATION

This product does not contain any chemicals subject to the reporting requirements of SARA, TITLE III, Section 313 (40CFR372) or known to the State of California to cause cancer or birth defects (to comply with California Statute [Section 25249.6]).

Enthone-OMI Inc.
a subsidiary of ASARCO

P.O. BOX 1900
NEW HAVEN, CT 06508

(203) 934-8611

MATERIAL SAFETY DATA SHEET

ENTHONE

ENPREP™ 109

24 HOUR EMERGENCY PHONE NUMBERS
CHEMTREC 800-424-9300

NON-EMERGENCY PHONE NUMBERS
ENTHONE 203-934-8611
UDYLITE 313-497-9100
SEL-REX 313-497-9100

PRODUCT CODE#: RA15
DATE ISSUED: 12/17/93
SUPERCEDES: 10/9/92(Enprep 109 S.C.)
PREPARER: L.T. Horbal

II. HAZARDOUS INGREDIENTS

COMPONENT	COMMON NAME	CAS NO.	OSHA-PEL	ACGIH-TLV	%
Water		7732-18-5	NI	NI	>60
Potassium Hydroxide	Caustic Potash	1310-58-3	2 mg/m3	2 mg/m3	<20
Sodium Hydroxide	Caustic Soda	1310-73-2	2 mg/m3	2 mg/m3	<10
Silicates & Phosphates		NA	NI	NI	<10
No Chelator Present					

III. PHYSICAL PROPERTIES

SPECIFIC GRAVITY (WATER =1)	1.23	BOILING POINT, °F	>200
EVAP.RATE (BUTYL ACETATE=1)	NA	MELTING POINT, °F	NA
VAPOR PRESSURE, mmHg	NA	SOLUBILITY IN WATER	100%
VAPOR DENSITY (AIR=1)	NA	APPEARANCE	Clear Dark Brown Liquid
pH (AS IS)	>13	ODOR	None

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT, °F	None	FLAMMABLE LIMITS (AIR)	NA	LEL	NA	UEL

EXTINGUISHING MEDIA

[X] Not Combustible [ ] Water fog or spray [ ] Carbon Dioxide [ ] Dry Chemical [ ] Alcohol Foam [ ] Foam [ ] Sand or Earth

SPECIAL FIRE FIGHTING PROCEDURES

Wear self-contained breathing apparatus (SCBA) and complete personal protective equipment when potential for exposure to vapors or products of combustion exists.

UNUSUAL FIRE AND EXPLOSION HAZARDS

None

V. HEALTH HAZARD DATA

EFFECTS OF ACUTE EXPOSURE:

INHALATION: Mist or vapor may severely irritate respiratory tract.

INGESTION: Can cause severe burns to mouth, esophagus and stomach.

SKIN: Can cause severe burns.

EYES: Can cause burns with damage to eyes and possible blindness.

EFFECTS OF CHRONIC EXPOSURE:

Chronic exposure effects not established.

CARCINOGEN: Not listed by NTP, IARC, OSHA.

REFERENCE: NA

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove person from contaminated area. If breathing has stopped, resuscitate and administer oxygen if available.
Seek immediate medical attention.

INGESTION: Never give anything by mouth to an unconscious person, obtain immediate medical attention. If vomiting occurs spontaneously, keep airway clear. If swallowed DO NOT INDUCE VOMITING, give large amounts of water.
Seek immediate medical attention.

SKIN: Immediately wash contaminated skin with plenty of water. Remove contaminated clothing and footwear. Wash clothing before reuse. Discard footwear if it cannot be decontaminated. If irritation continues, seek medical attention.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds of exposure is essential to minimize damage.
Seek immediate medical attention.

VI. PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL PROCEDURES:

Avoid contact with skin, eyes and clothing. Wear protective equipment (see Section VII). Do not breathe mist or vapors. Contain spill and soak up with suitable absorbent. Shovel into suitable container for disposal. Neutralize residual alkalinity with dilute acid such as dilute acetic or phosphoric acids. Flush spill area with copious amounts of water. Alkaline spills may result in slippery surfaces. Dispose of in accordance with Local, State and Federal regulations.

STORAGE AND HANDLING PRECAUTIONS:

Store in a cool, dry place. Keep away from acids. Loosen cover cautiously when opening.

ADDITIONAL INFORMATION:

Wash thoroughly after handling.

VII. CONTROL MEASURES

VENTILATION: Local exhaust recommended.

RESPIRATOR: Use NIOSH approved respirator when air concentration is greater than the TLV or PEL. Use cartridge filter for alkaline mist.

EYE PROTECTION: [ ] Safety glasses [X] Chemical safety goggles [X] Face shield

PROTECTIVE GLOVES: [X] Neoprene [ ] Natural rubber Other: Butyl Rubber

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:

Wear full protective work clothing.

WORK/HYGENIC PRACTICES:

Emergency eye wash and safety shower should be available. Wash thoroughly after handling.

ADDITIONAL INFORMATION:

For waste disposal of spilled or contaminated product follow Enthone-OMI Waste Disposal Procedures. If necessary, consult Enthone-OMI for disposal assistance. Dispose of in accordance with Local, State and Federal regulations.

CAS = Chemical Abstract Service
NI = No relevant information available
NA = Not applicable
Trade Secret = Claimed as allowed under 29 CFR 1910.1200
PEL = OSHA Permissible Exposure Limit
TLV = ACGIH Threshold Limit Value
NTP = National Toxicology Program
IARC = Int'l Agency for Research on Cancer

VIII. REACTIVITY DATA

X	Stable	CONDITIONS TO AVOID:	Stable under normal conditions. See Incompatibility information.
	Unstable		

INCOMPATABILITY (Materials to avoid): Acids

HAZARDOUS DECOMPOSITION PRODUCTS: None

HAZARDOUS POLYMERIZATION		May occur	CONDITIONS TO AVOID: None
	X	Will not occur	

IX. ADDITIONAL INFORMATION

This product does not contain any chemicals subject to the reporting requirements of SARA, TITLE III, Section 313 (40CFR372) or known to the State of California to cause cancer or birth defects (to comply with California Statute [Section 25249.6]).

Material Safety Data Sheet

CAIROX®
Potassium Permanganate

NFPA* HAZARD SIGNAL

Health Hazard (less than 1 hour exposure)	1 =	Materials which under fire conditions would give off irritating combustion products. Materials which on the skin could cause irritation.
Flammability Hazard	0 =	Materials that will not burn.
Reactivity Hazard	0 =	Materials which in themselves are normally stable, even under fire exposure conditions, and which are not reactive with water.
Special Hazard	OXY =	Oxidizer

*National Fire Protection Association 704

Section I Product Identification

MANUFACTURER'S NAME: CARUS CORPORATION		**TELEPHONE NUMBER FOR INFORMATION:**	1-815-433-9070
MANUFACTURING FACILITY:	Carus Chemical Company 1500 Eighth Street LaSalle, IL 61301	**EMERGENCY TELEPHONE NO.:** **CHEMTREC TELEPHONE NO.:**	1-800-435-6856 1-800-424-9300
PRODUCT NAME: CAIROX® Potassium Permanganate, $KMnO_4$		**TRADE NAME:** CAIROX® Potassium Permanganate	
SYNONYMS: Permanganic acid potassium salt Chameleon mineral Condy's crystals Permanganate of potash			

DEPARTMENT OF TRANSPORTATION INFORMATION:

Proper Shipping Name: 49CFR172.101 ..... Potassium Permanganate
ID Number: 49CFR172.101 ..... UN 1490
Hazard Class: 49CFR172.101 ..... Oxidizer
Packaging Group II 49CFR172.101
Additional Labeling Requirements: 49CFR172.402(a)(2) ..... Corrosive
Hazardous Substance
Reportable Quantity: 40CFR116.4; 40CFR302.4 ..... RQ-100 lb.

Chemtrec Telephone No. (800) 424-9300

RCRA: Oxidizers such as potassium permanganate meet the criteria of ignitable waste. 40 CFR261.21

Registry of Toxic Effects of Chemical Substances
RTECS #SD6475000

CAIROX® Potassium Permanganate contains 33-35% manganese as part of the chemical infrastructure (manganese compounds CAS Reg. No. N/A) and is subject to the reporting requirements of Section 313 of Title III, Superfund Amendments and Reauthorization Act of 1986 and 40 CFR372.

FIRST RESPONDERS:

Wear protective gloves, boots, goggles, and respirator. In case of fire, wear positive pressure breathing apparatus. Approach incident with caution. Use Emergency Response Guide 35 (DOT P5800.4).

carus
CHEMICAL COMPANY

Section II Hazardous Ingredients

Material or component	CAS No.*	%	Hazard Data
Potassium Permanganate	7722-64-7	97% min. $KMnO_4$	PEL:** C***: 5 mg Mn per cubic meter of air TLV-TWA***: 5 mg Mn per cubic meter of air 5 mg Mn per cubic meter of air is equivalent to 0.0046 ounces per 1000 cubic feet of air.

*Chemical Abstract Service Number

**OSHA Permissible Exposure Limit, manganese compounds (expressed as Mn) 29CFR1910.1000 Table Z-A1.

***American Conference of Governmental Hygienists 1988/1989, for manganese dust and compounds, expressed as Mn. TLV-TWA = The time weighted average concentration for a normal 8 hour workday and a 40 hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.

****Ceiling Exposure Limit or maximum exposure concentration not to be exceeded under any circumstances.

Section III Physical Data

BOILING POINT, 760 mm Hg	Not applicable	**SPECIFIC GRAVITY**	2.7 g/cm³ 20°C (68°F)
VAPOR PRESSURE (mm Hg)	Not applicable	**VAPOR DENSITY (AIR = 1)**	Not applicable
SOLUBILITY IN WATER % BY SOLUTION	6.0% at 20°C (68°F); and 20% at 65°C (149°F)		
PERCENT VOLATILE BY VOLUME	Not Volatile	**EVAPORATION RATE (BUTYL ACETATE = 1)**	Not applicable
MELTING POINT	Starts to decompose with evolution of oxygen (O_2) at temperatures above 150°C (302°F)		
APPEARANCE AND ODOR	Dark purple solid with a metallic luster, odorless		

Section IV Fire and Explosion Hazard Data

The material itself is noncombustible but will accelerate the burning of combustible material.

FLASHPOINT None

FLAMMABLE OR EXPLOSIVE LIMITS Lower: Nonflammable Upper: Nonflammable

EXTINGUISHING MEDIA Use large quantities of water. Water will turn pink to purple if in contact with potassium permanganate. Dike to contain.

SPECIAL FIREFIGHTING PROCEDURES Watch for rapid burning and be prepared to retreat to a safe distance. If yellow, white or brown fumes are present, wear positive pressure breathing apparatus and full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS Powerful oxidizing material. May decompose spontaneously if exposed to intense heat (150°C/302°F). May be explosive in contact with some other chemicals. May react violently with finely divided and readily oxidizable substance. Increases flammability of combustible materials.

Section V Health Hazard Data

POTASSIUM PERMANGANATE Acute oral LD_{50}(rat) = 780 mg/kg Male (14 days) 525 mg/kg Female (14 days)
The fatal dose by ingestion is estimated to be 10 grams or 0.35 ounces.

ROUTES OF EXPOSURE

1. Inhalation
   Acute inhalation toxicity data are not available; however, airborne concentrations of potassium permanganate in the form of dust, mist, or spray may irritate and cause damage to the respiratory tract.
2. Skin Contact
   Prolonged contact of solutions at room temperature may be irritating to the skin, leaving brown stains on the skin. Concentrated solutions at elevated temperature and crystals are corrosive to the skin.
3. Eye Contact
   Potassium permanganate is corrosive to eye tissue on contact. It may cause severe burns that result in damage to the eye.
4. Ingestion
   Potassium permanganate, if swallowed, may cause severe burns to mucous membranes of the mouth, throat, esophagus, and stomach.

continued

Health Hazard Data (cont.)

EFFECTS OF OVEREXPOSURE

1. Acute Overexposure (instantaneous overexposure)
   Irritating or corrosive to body tissue on contact
2. Chronic Overexposure (long term overexposure)
   Prolonged exposure, usually many years, to heavy concentrations of dust and fumes above the TLV-value, mainly in the form of manganese oxides may lead to lung irritation and central nervous system disorder. The symptoms may simulate Parkinson's disease. No known cases of central nervous system disorders due to exposure to $KMnO_4$ have been reported.
3. Carcinogenicity
   Potassium permanganate has not been classified as a carcinogen by OSHA, NTP, IARC.
4. Medical Conditions Generally Aggravated by Exposure
   Potassium permanganate will cause further irritation of tissue or open wounds, burns and mucous membranes.

EMERGENCY AND FIRST AID PROCEDURES

1. Eyes
   Immediately flush eyes with large amounts of water for at least 15 minutes holding lids apart to ensure flushing of the entire surface. Do not attempt to use a chemical antidote. Seek medical attention immediately.
   Note to physician: Decomposition products are alkaline.
2. Skin
   Immediately wash contaminated areas with plenty of water. Remove contaminated clothing and footwear. Wash clothing and decontaminate footwear before use. Seek medical attention immediately if irritation is severe.
3. Inhalation
   Get person out of contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. Seek medical attention immediately.
4. Ingestion
   Never give anything by mouth to an unconscious or convulsing person. If conscious, give large quantities of water. Seek medical attention immediately.

Section VI Reactivity Data

STABILITY	Under normal conditions, the material is stable.
CONDITIONS TO AVOID	Contact with incompatible materials or heat (>150°C/302°F) Do not mix with formaldehyde.
INCOMPATIBLE MATERIALS	Contact with acids, peroxides, and all combustible organic or readily oxidizable materials including inorganic oxidizable materials and metal powders. With hydrochloric acid, chlorine gas is liberated.
HAZARDOUS DECOMPOSITION PRODUCTS	When involved in fire, corrosive fumes or smoke may be formed.
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	Material is not known to polymerize.

Section VII Spill or Leak Procedures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

Clean up spills immediately by sweeping or shoveling up the material; do not return contaminated material to original drum. Transfer to a clean metal drum. EPA banned the land disposal of D001 ignitable waste oxidizers. These wastes have to be deactivated by reduction (see below). To clear contaminated floors flush with abundant quantities of water into sewer, if permitted by Federal, State, and Local regulations. If not, collect water and treat chemically. (See below)

DEACTIVATION OF D001 IGNITABLE WASTE OXIDIZERS BY CHEMICAL REDUCTION

Reduce material in aqueous solution with sodium thiosulfate (Hypo), a bisulfite or ferrous salt solution. The bisulfite or ferrous salt may require some dilute sulfuric acid to promote rapid reduction. Neutralize with sodium bicarbonate to neutral pH if acid was used. Decant or filter and mix formed sludge with sodium carbonate and deposit in an approved landfill. Where permitted, the sludge can be drained into sewer with large quantities of water. Contact Carus Chemical for additional recommendations.

Section VIII Protective Equipment to Be Used

VENTILATION REQUIREMENTS Provide sufficient mechanical and/or local exhaust to maintain exposure below the Permissible Exposure Limit.
RESPIRATORY PROTECTION In the case where overexposure may exist, the use of NIOSH-MSHA dust and mist respirator (such as NIOSH-MSHA TC-21C-287) or an air supplied respirator is advised. Engineering or administrative controls should be implemented to control dust.
EYE Face shield and/or goggles should be worn.
GLOVES Rubber or plastic gloves should be worn.
OTHER PROTECTIVE EQUIPMENT Normal work clothing covering arms and legs and rubber apron should be worn.
WORK/HYGIENIC PRACTICES Wash thoroughly with soap and water after handling and before eating or smoking.

Section IX Special Precautions and Other Comments

Protect containers against physical damage. Store in a cool, dry area in closed containers. Segregate from acids, peroxides and all combustible, organic or easily oxidizable materials.

DEPARTMENT OF TRANSPORTATION INFORMATION:

Proper Shipping Name: 49CFR172.101 ..... Potassium Permanganate
ID Number: 49CFR172.101 ..... UN 1490
Hazard Class: 49CFR172.101 ..... Oxidizer
Additional Labeling Requirements: 49CFR172.402(a)(2) ..... Corrosive
Hazardous Substance
Reportable Quantity: 40CFR116.4; 40CFR302.4 ..... RQ-100 lb.

Chemtrec Telephone No. (800) 424-9300

RCRA: Oxidizers as potassium permanganate meet the criteria of ignitable waste. 40 CFR261.21

FIRST RESPONDERS:
Wear protective gloves, boots, goggles, and respirator. In case of fire, wear positive pressure breathing apparatus. Approach incident with caution. Use Emergency Response Guide 35 (DOT P5800.4).

Registry of Toxic Effects of Chemical Substances
RTECS #SD6475000

CAIROX® Potassium Permanganate contains 33-35% manganese as part of the chemical infrastructure (manganese compounds CAS Reg. No. N/A) and is subject to the reporting requirements of Section 313 of Title III, Superfund Amendments and Reauthorization Act of 1986 and 40 CFR372.

Name: Horst R. Adolf

Signature: Horst R. Adolf

Revision Date: May 1992

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carus CHEMICAL COMPANY
Division of Carus Corporation
1001 Boyce Memorial Drive
Ottawa, Illinois 61350
Telephone 815-433-9070

carus

POTASSIUM PERMANGANATE
UN 1490

Potential Hazards

Fire or Explosion

May ignite other combustible materials (wood, paper, oil, etc.). These materials will accelerate burning when they are involved in a fire; some will react violently with fuels.
Runoff to sewer may create fire or explosion hazard.

Health Hazards

Contact may cause burns to skin and eyes.
Vapors or dust may be irritating.
Fire may produce irritating or poisonous gases.
Runoff from fire control or dilution water may cause pollution.

Emergency Action

Keep unnecessary people away; isolate hazard area and deny entry.
Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters; protective clothing will provide limited protection.
CALL CHEMTREC at (800) 424-9300 FOR EMERGENCY ASSISTANCE.
If water pollution occurs, notify the appropriate authorities.

Fire

Small Fires: Water only; no dry chemical, CO_2 or Halon.
Large Fires: Flood fire area with water from a distance.
Move container from fire area if you can do it without risk.
Apply cooling water to sides of containers exposed to flames until well after fire is out.
For massive fire in cargo area use unmanned hose holder or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

Spill or Leak

Do not touch or walk through spilled material.
Keep combustibles (wood, paper, oil, etc.) away from spilled material.
Small Dry Spills: With clean shovel, place material into clean, dry container and cover loosely; move containers from spill area.
Small Liquid Spills: Take up with sand, earth or other noncombustible absorbent material.
Large Spills: Dike far ahead of liquid spill for later disposal.

First Aid

Move victim to fresh air; call emergency medical care.
In case of contact with material, immediately flush skin or eyes with running water for at least 15 minutes.

Source: Emergency Response Guide - 1990 Guide #35 - DOT P 5800.5

MATERIAL SAFETY DATA SHEET

INDUSTRIAS SULFAMEX, S.A.
Tampico, Mexico

Distributor - North America
AGROMEX, INC.
Mobile, Alabama

FOR HEALTH HAZARD INFORMATION, CALL: -(205) 443-5665

Date of Revision: 03/12/90

- Product Name: TECMANGAM (R) Soluble Manganese Sulfate

- Synonym: Manganese Sulfate (81-83.8)

- Formula: Mixture

SECTION II. PRODUCT AND COMPONENT HAZARD DATE

A. COMPONENTS:

	Approx. Percent	TLV**	CAS Reg.No.
*Manganese Sulfate	83.8	5 mg/m3 (as Mn)	7785-87-7
Magnesium Sulfate	2.0	None	7487-88-9
Calcium Sulfate	.5	None	7788-18-9
Water	1.0	None	7732-18-5

*Principal hazardous component
**See Section VI-A for additional information on exposure limits.

B. PRECAUTIONARY LABEL STATEMENTS:

WARNING! MAY BE HARMFUL IF INHALED
CAUSES IRRITATION

Avoid breathing dust.
Avoid contact with eyes.
Avoid prolonged or repeated contact with skin.
Use with adequate ventilation.
Wash thoroughly after handling.

FIRST AID: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician. Wash skin with soap and plenty of water. Wash clothing before reuse. In case of irritation of eyes, nose, and throat, remove from exposure, treat symptomatically, and call a physician if symptoms persist.

Since emptied packages retain product residue, follow label warnings even after package is emptied.

Notice: Manganese Sulfate may discolor ornamental surfaces, rock, tile, masonry, etc. Contact with these surfaces should be avoided. If contact occurs, wash area immediately with water.

SECTION III. PHYSICAL DATA

- Appearance and Odor: White to cream-colored powder, practically odorless.
- Boiling Point: Not applicable.
- Specific gravity (H2O = 1): 0.87 at 20°/20°C
- Vapor Pressure: Not applicable.
- Percent Volatile by Volume: Not applicable.
- Vapor Density (Air = 1): Not applicable.
- Evaporation Rate: Not applicable.
- Solubility in Water: Appreciable (approx. 99%).

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

- Flash Point: Not applicable (Noncombustible).
- Flammable Limits: Not applicable.
- Extinguishing Agent: Use appropriate agent for surrounding fire.
- Special Fire-Fighting Procedures: None known to Sulfamex.
  Unusual Fire and Explosion Hazards: None known to Sulfamex.

SECTION V. REACTIVITY DATA

- Stability: Stable.
- Incompatibility: None known to Sulfamex.
- Hazardous Decomposition Products: Decomposes to oxides of manganese and sulfur.
- Hazardous Polymerization: Will not occur.

SECTION VI. TOXICITY AND HEALTH

A. EXPOSURE LIMITS

- OSHA Permissible Exposure Limit (PEL): Manganese sulfate (as Mn): 5 mg/m3-C.
- Threshold Limit Value (TLV): Manganese Sulfate (as Mn): 5mg/M3-C, ACGIH, 1982.
- A NIOSH industrial hygiene analytical method for manganese is available. (1)
- An industrial hygiene analytical method for Manganese Sulfate is available to health and safety professionals upon request.

B. EXPOSURE EFFECTS

Inhalation: May be harmful if inhaled. May cause irritation of the nasal passages.

Eyes: Dust may cause irritation.

Skin: Prolonged or repeated contact may cause irritation.

C. FIRST AID

Inhalation: Remove from exposure. Treat symptomatically, and get medical attention if symptoms persist.

Eyes: Immediately flush with plenty of water for at least 15 minutes and get medical attention.

Skin: Immediately wash with soap and plenty of water. Wash contaminated clothing before reuse.

D. ANIMAL TOXICITY DATA

The composition of this product varies from one batch to another; however, toxicity data felt to be representative of this variable product are provided below:

Test	Species	Result (2)	Toxicity Classification (3)
Acute oral LD_{50}	Rat	1600-3200 mg/kg	Slightly Toxic
Acute oral LD_{50}	Mouse	800-1600 mg/kg	Slightly Toxic
Dermal LD_{50}	Guinea pig	>1000 mg/kg	
Skin irritation	Guinea pig	Slight	
Eye irritation	Rabbit	Moderate	

In the 1930's, manganese ore mining and processing operations were studied, and it was determined that chronic overexposure to manganese ore dust produced a disease of the nervous system with symptoms similar to Parkinson's diesease: tremor, rigidity of facial expression, stooped posture, and stiffness and slowness of movements. (4) Other reported illnesses include pneumonia and metal fume fever. (5) Although these effects in humans have occurred from exposure to manganese ore, manganese dioxide, and finely divided manganese, a thorough search of the world medical literature has disclosed no reports of such effects occurring from exposure to manganese sulfate, the form of manganese present in Tecmangam®. Eastman Chemical Products, Inc. reported that no neurotoxicity, pulmonary disease, nor metal fume fever have been seen in Eastman employees who have worked with Tecmangam for many years, although irritation of the nasal mucous membrances, skin irritation, and eye irritation have been observed. (6)

SECTION VII. PERSONAL PROTECTION AND CONTROLS

A. RESPIRATORY PROTECTION

An appropriate NIOSH-approved respirator for dust should be worn if needed.

B. VENTILATION

General: Recommend at least 10 air changes per hour for good general room ventilation.

Local Exhaust: Recommended to control dust. See Section VI-A for information on exposure limits. Maintain workroom air concentrations below irritating levels.

C. SKIN AND EYE PROTECTION

Safety glasses should be worn in any type of industrial operation. Protective gloves should be worn.

D. OTHER CONTROL MEASURES

An eye bath and washing facilities should be available. Wash thoroughly after handling.

SECTION VIII. SPECIAL STORAGE AND HANDLING PRECAUTIONS

Since emptied packages retain product residue, follow label warnings even after package is emptied.

SECTION IX. SPILL, LEAK, AND DISPOSAL PRACTICES

Steps to be taken in case material is released or spilled: Collect and contain for salvage or disposal.

Waste Disposal Method: Landfill. Observe all federal, state, and local laws concerning health and environment.

SECTION X. ENVIRONMENTAL EFFECTS DATA

A. SUMMARY: This product has not been tested for environmental effects. However, some laboratory test data and published data (7,8) are available for all of the major components of this product, and these data have been used to provide the following estimate of environmental impact:

This product has a low biological oxygen demand, and it is expected to cause little oxygen depletion in aquatic systems. It is expected to have a low potential to affect aquatic organisms, secondary waste treatment micro-organisms, and the germination and growth of some plants. If diluted with a large amount of water, this product released directly or indirectly into the environment is not expected to have a significant impact.

SECTION XI. TRANSPORTATION

DOT Hazard Classification: Not regulated by DOT

SECTION XII. REFERENCES

1. NIOSH Manual of Analytical Methods, 2nd Edition, Volume 2. Issued by the National Institute for Occupational Safety and Health. Washington, U.S. Government Printing Office, 1977, Method S5.

2. H. C. Hodge and J. H. Sterner, Tabulation of toxicity classes. Am. Ind. Hyg. Assoc. Q. 1949; 10:93-96.

3. R.H. Flinn, Et Al. Chronic Manganese Poisoning in an Ore-Crushing Mill. Public Health Bulletin No. 247, 1940.

4 A. Hamilton and H.L. Hardy, Industrial Toxicology. Acton, MA, Publishing Sciences Group, Inc., 1974, pp 127-130.

5. Battele's Columbus Laboratories, Water Quality Critical Data Book Volume - 3 - Effects of Chemicals on Aquatic Life, Selected data from the literature through 1968. Washington, U.S. Environmental Protection Agency, Project No. 18050 GWV, Contract No. 68-01-007, May 1971.

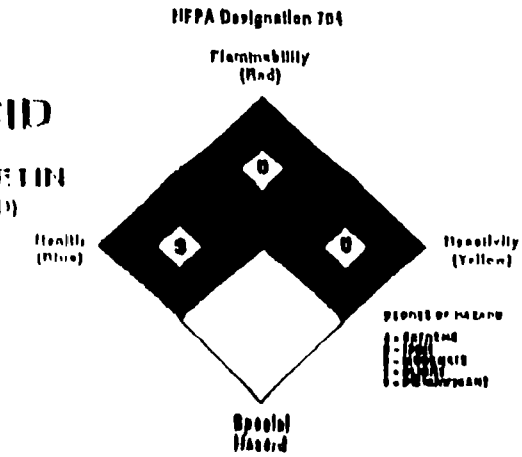
6. J.E. McKee and H.W. Wolf, Editors. Water Quality Criteria, Publ. No. 3-A (Revised). State of California, 1963.

HYDROCHLORIC ACID

MATERIAL SAFETY DATA BULLETIN

(PURSUANT TO 29 CFR 1910, 1200g AMENDED)

REAGENT CHEMICAL
& RESEARCH INC.
124 River Road
Middlesex, New Jersey 08846



EMERGENCY PHONE
800-231-1607 - 24 HOUR
800 424 9300 - (CHEMTREC)

EMERGENCY RESPONSE GUIDEBOOK NUMBER
ID# 1789, Guide 60

PRODUCT NAME
Hydrochloric Acid, 20° or 22° Baumé

PRODUCT CAS NUMBER
7647 01 0

CHEMICAL FORMULA
HCl

TRADE NAME & SYNONYMS
Hydrochloric Acid - Muriatic Acid

TRANSPORTATION INFORMATION

Proper Shipping Name	- Hydrochloric Acid
Hazard Class	- Corrosive Liquid
UN/NA Identification	- UN1789
Hazard Class	- 8
Packaging Group	- II
IM 101 Poison?	- NO
Reportable Quantity	- RQ 5000 lbs
DOT Labels Required	- Corrosive
IMDG Labelling	8 0 0 X

SARA TITLE III ☑ Yes
Section 312 ☑ Yes Section 313 ☑ Yes

RCRA WASTE NUMBER
D002

CHEMICAL FAMILY
Inorganic Acid

HAZARDOUS INGREDIENTS

COMPONENTS	%	THRESHOLD LIMIT VALUE
Hydrogen Chloride	31.45 - 37.0	Ceiling-5.0 ppm

PHYSICAL DATA

APPEARANCE (Solid, Liquid, Gas) Liquid @ 20° C, 1 atm	MOLECULAR WEIGHT 36.5	FREEZING TEMP. -53° C; -63° F	SPECIFIC GRAVITY 1.1600 - 1.1881
VAPOR DENSITY (AIR = 1) N.A.	COLOR Clear/Slightly Yellow	BULK DENSITY 9.671-9.908 lb/gal	BOILING POINT 110° C/230° F
VAPOR PRESSURE 50 - 60 mm Hg @ 20° C	SOLUBILITY (Water) Very Soluble	ODOR Sharp, Pungent, Irritant	% VOLATILE BY VOL. N.A.

FIRE & EXPLOSION DATA

FLASH POINT (Method Used)	FLAMMABLE LIMIT	EXTINGUISHING MEDIA
N.A.	Non-flammable	N.A.

SPECIAL FIRE FIGHTING PROCEDURES, UNUSUAL FIRE OR EXPLOSION HAZARDS

Non flammable, but Hydrochloric Acid reacts with all metals, except gold and platinum, with rapid evolution of Hydrogen which is flammable and explosive in air. Firefighters exposed to Hydrochloric Acid vapors should wear Scott Air-Pak or equivalent. Hydrogen Chloride vapors are extremely irritating to the respiratory tract and may cause breathing difficulty.

SPILL, DISCHARGE OR DISPOSAL.

GENERAL

Spills or discharges into the environment involving large quantities of Hydrochloric Acid should be controlled and cleaned up according to a pre determined alternative, written Spill Prevention and Control Program. For assistance in developing a SPCP contact your nearest Reagent Sales Office.

PERSONNEL

All personnel involved in a spill clean-up should follow the recommendations and practices set forth below (refer to Industrial Hygiene).

PROCEDURE

Spills should be handled immediately by neutralization and dilution of the spilled Product by the use of Soda Ash (Sodium Carbonate), Lime (Calcium Hydroxide) or Limestone (Calcium Carbonate) with large amounts of water. For an interior (inside a closed space) spill be aware that the use of Soda Ash, Lime and Limestone will evolve Carbon Dioxide and that ample ventilation be provided.

DISPOSAL

Under Federal RCRA, it is the responsibility of the user of Products to determine, at the time of disposal, whether the Product falls under the RCRA as a hazardous waste. This is because Product uses, transformations, syntheses, mixtures, etc. may render the resulting end product hazardous.

INDUSTRIAL HYGIENE

EYE CONTACT

Chemical goggles and full face shields must be worn at all times by personnel exposed to or handling Hydrochloric Acid.

SKIN CONTACT

Impervious clothing, gloves, footwear and head gear must be worn at all times by Personnel exposed to or handling Hydrochloric Acid.

INHALATION

The use of a NIOSH approved full face piece cartridge respirator or a Scott Air-Pak should be used by all personnel exposed to or handling Hydrochloric Acid.

RESPIRATOR SELECTION:

100 ppm concentration — chemical cartridge respirator with Acid gas cartridge with full face piece.

Escape — *self contained breathing apparatus.*

BIBLIOGRAPHY SOURCE REFERENCE

1. NIOSH-RTECS--Registry of Toxic Effects of Chemical Substances Volumes I-V — 1986.
2. American Conference of Governmental Industrial Hygienist — 1986.
3. Dangerous Properties of Industrial Material, SAX -- Edition Six.
4. Handbook of Toxic and Hazardous Chemicals and Carcinogens, Second Edition, Marshall Sittig.
5. Industrial Hygiene and Toxicology, Patty — Volumes I-II ABC.

DISCLAIMER OF LIABILITY

REVISED FEBRUARY 1994

TOXICOLOGY

GENERAL

Hydrogen Chloride, both as a gas and in a solution as Hydrochloric Acid, is a corrosive substance and can cause severe and painful burns on contact with any part of the body or if taken internally. The mucous membranes of the eyes and the upper respiratory tract are especially susceptible to the irritating effects of high atmospheric concentrations of Hydrogen Chloride. The gas or vapor is so penetrating and pungent that when high concentrations do occur those exposed should immediately leave the contaminated area.

ROUTES OF ENTRY

Inhalation of the gas or mist; ingestion, eye and skin contact with both the gas and/or mist are possible routes of entry.

INGESTION

When concentrated Hydrochloric Acid is swallowed, it causes severe burns of the mucous membranes of the mouth, oesophagus and stomach. The lips and mouth usually turn white, and later brown. There is pain in the throat and stomach, difficulty in swallowing, intense thirst, nausea and vomiting, followed by diarrhea and, in severe cases, by collapse and unconsciousness.

EYE CONTACT

Contact of the eyes with Hydrogen Chloride, either as a gas or in solution, *rapidly causes severe* irritation and painful burns of the eyes and eyelids. If the acid is not quickly removed by thorough irrigation with water, there may be prolonged or permanent visual impairment or total loss of sight. *Wash the affected area for 15 minutes with large amounts of water.*

SKIN CONTACT

Concentrated solutions are destructive to clothing and on contact with skin, cause severe burns *unless promptly washed off. Repeated skin contact with dilute solutions may lead to the* development of dermatitis. Exposure to the concentrated vapor of Anhydrous Hydrogen Chloride may also result in burns or dermatitis.

INHALATION

Inhalation of excessive concentrations of Hydrogen Chloride vapors immediately produces severe irritation of the upper respiratory tract, resulting in coughing, burning of the throat, and a choking sensation. *Reactions encountered in man have usually been limited to inflammation and occasional* ulceration of the nose, throat and larynx. If inhaled deeply, edema of the lungs may occur.

TOXICOLOGY DATA

(a) Toxicity:
- Inhalation, human LCLo: 1300 ppm/30 min.
- Oral, rabbit LD_{50}: 900 mg/Kg.

(b) Mutagenic Effects:
- Chromosome damage, Inhalation: 100 ppm/24 hours
- Chromosome damage, Oral: 100 ppm
- Cytogenic effects, Parenteral: 20 mg

(c) OSHA Standard: Air: TLV 5 ppm
- Air: TLV 7 mg/cubic meter

(d) ACGIH Limit Values: Hydrogen Chloride TWA-STEL 5 ppm
- TWA-STEL 7 mg./cu. meter

(e) TOSCA: Reported in TOSCA Inventory in 1980.

NOTE: The sources of the toxicology data are:
1. NIOSH Registery of Toxic Effects of Chemical Substances 1986 Volumes I-V.
2. Patty Industrial Hygiene and Toxicology Volume 2-A, B, C.
3. American Conference of Governmental Industrial Hygienists 1988.

The above quoted data are an abstract only of the complete information disclosed in the source documents. Reagent will supply, upon request, photos of the complete source documents referred to herein. Please phone the nearest Reagent Sales Office.

TOXICOLOGY DATA

CARCINOGENIC STATEMENT:

National Toxicology Register	☑ No	OSHA Register	☑ No
IARC Monograph	☑ No	ACGIH 1987-88	☑ No

STABILITY

GENERAL

Hydrochloric Acid is a stable compound and forms an azeotrope that boils at 108.6°C. or 227.5°F. at one atmosphere and contains 20.22% Hydrogen Chloride.

The gaseous form, Hydrogen Chloride, begins dissociation at 1500°C. or 2732°F.

CHEMICAL REACTIVITY

GENERAL

Hydrochloric Acid is chemically stable when properly contained and handled. It is a strong mineral acid and reacts with many metals and metal oxides and hydroxides to form the equivalent metal chloride. It reacts with zeolites and other silicious compounds to form Hydrosilicic Acid. It reacts with carbonates to form Carbon Dioxide and Water. It is oxidized by Oxygen or electrolysis to form Chlorine, a lethal, poisonous gas. It reacts with alkaline compounds to form a neutral salt. It is a hydrolyzing agent for carbohydrates, esters and other compounds.

The reaction of Hydrochloric Acid with most metals will produce Hydrogen, an explosive, flammable gas.

Violent reactions will result when Hydrochloric Acid reacts with acetic anhydride, 2-aminoethanol, ammonium hydroxide, calcium phosphide, chlorosulfonic acid, ethylene diamine, ethylene imine oleum (fuming sulfuric acid), perchloric acid, beta propiolactone, propylene oxide, sodium hydroxide, sulfuric acid, uranium phosphide and vinyl acetate. This listing is not all inclusive

FIRST AID

GENERAL

If a known exposure occurs or is suspected, immediately initiate the recommended procedures below. Simultaneously contact a physician, the nearest hospital, or the nearest Poison Control Center. Inform the person contacted of the type and extent of exposure, describe the victim's symptoms and follow the advice given. For additional information, call, day or night, Reagent (800) 231-1607 or Chemtrec (800) 424-9300.

INGESTION

DO NOT induce vomiting. Immediately give large quantities of water or milk, if available. If vomiting does occur, give fluids again. Never give anything by mouth to an unconscious person. Call a physician or the nearest Poison Control Center immediately.

EYE CONTACT

Immediately flush the eyes with large quantities of running water for a minimum of 15 minutes. Hold the eyelids apart during the flushing to ensure rinsing of the entire surface of the eyes and lids with water. DO NOT attempt to neutralize with chemical agents. Obtain medical attention as soon as possible. Oils or ointments should not be used. Continue the flushing for an additional 15 minutes if the physician is not immediately available.

SKIN CONTACT

Immediately remove contaminated clothing under a safety shower. Flush all affected areas with large amounts of water for at least 15 minutes. DO NOT attempt to neutralize with chemical agents. Obtain medical advice immediately.

INHALATION

Remove from contaminated atmosphere. If breathing has ceased, clear the victim's airway and start mouth-to-mouth artificial respiration, which may be supplemented by the use of a bag mask respirator, or a manually-triggered, oxygen supply capable of delivering 1 liter/second or more. If the victim is breathing, oxygen may be administered from a demand-type or continuous flow inhalator, preferably with a physician's advice. Contact a physician immediately.

ADDITIONAL REGULATORY INFORMATON

TOXIC SUBSTANCES CONTROL ACT

This substance is listed on the Toxic Substances Control Act Inventory.

SUPERFUND AMENDMENT AND REAUTHORIZATION ACT, TITLE III

HAZARD CATAGORIES: HEALTH: Immediate (Acute) PHYSICAL : NONE
Delayed (Chronic)

EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW

Extremely Hazardous Substance - Threshold Planning Quantity: None Established

IS THIS PRODUCT REGULATED UNDER 1990 CLEAN AIR ACT? ☑ NO

DOES THIS PRODUCT CONTAIN, OR IS MANUFACTURED WITH, CFC's? ☑ NO

VIGORO
INDUSTRIES, INC.

MATERIAL SAFETY DATA SHEET
NITRIC ACID
(VARIOUS CONCENTRATIONS)

TRANSPORTATION EMERGENCIES: Call (800) 424-9300 (CHEMTREC)

HEALTH EMERGENCIES: Contact your local poison control center. Read the entire product label if available.

PRECAUTIONARY INFORMATION SUMMARY: This product is highly corrosive to all body tissues. Inhalation of the vapors or fumes may result in serious injury or possibly death.

I. PRODUCT INFORMATION:

Product Name: Nitric Acid — **Formula:** HNO_3

Chemical Name: Hydrogen Nitrate — **Chemical Family:** Inorganic Acid

CAS Number: 7697-37-2

Listed In: OSHA Subpart Z list- YES ACGIH TLV List- YES IARC Monographs- NO
NTP List- NO None of the Above- NO

TYPICAL COMPOSITION	PER CENT	CAS NUMBER
Hydrogen Nitrate (HNO_3)	Varies by Concentration	7697-37-2
Water	Balance	7732-18-5

EXPOSURE STANDARD: The ACGIH Threshold Limit Value of 2 ppm or 5 mg/m3 for an eight-hour time weighed average apply. The OSHA limits are Time Weighted Average (TWA) of 2 ppm, Short Term Exposure Level (STEL) of 4 ppm and ceiling, none assigned.

II. PERSONAL PROTECTION INFORMATION

VENTILATION: Adequate ventilation to keep Nitric Acid fumes below applicable standards (OSHA - 2 ppm)

SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

EYE: Tight fitting, shielded/vented chemical goggles required. A full face shield may be worn over goggles for additional protection. Contact lenses should not be worn by people exposed to Nitric Acid.

SKIN: Neoprene or PVC gauntlet-type gloves, apron, jackets or rain suits.

RESPIRATORY: If TLV of the product or any component is exceeded, a NIOSH/MSHA jointly approved air supplied respirator is advised in the absence of proper environmental controls. OSHA regulations also permit other NIOSH/MSHA respirators under specified conditions.

OTHER: Safety shower and eye wash fountain should be provided in the immediate area.

III. HEALTH INFORMATION

PHYSIOLOGICAL AND HEALTH EFFECTS

EYES: Causes severe damage and even blindness very rapidly.

SKIN: Will produce immediate burns with yellow skin discoloration, possibly deep ulceration.

INHALATION: Mist or fumes at 2 to 5 ppm over an eight-hour period may cause pulmonary irritation and symptoms of lung damage; greater than 200 ppm will cause severe pulmonary damage with possible fatal results after several minutes exposure (4-30 hours delay in onset).

INGESTION: Results in severe damage to mucous membranes (digestive tract) and deep tissues.

EMERGENCY AND FIRST AID PROCEDURES

EYES: Immediately wash eyes for 30 minutes MINIMUM with large amounts of water, holding eye lids open then see a physician.

SKIN: Immediately wash exposed area with large amounts of water for 20 minutes. Remove contaminated clothing. Move patient to fresh air and call a physician.

INHALATION: Move patient to fresh air. Call a physician and administer artificial respiration if patient is not breathing. Observe for 4-30 hours after inhalation for pulmonary edema.

INGESTION: Have conscious patient drink plenty of water or milk. DO NOT induce vomiting.

SYMPTOMS OF OVER EXPOSURE

ACUTE: Vapor or mist is an extreme irritant to eyes, nose, throat and skin. Liquid and high vapor concentrations may result in severe burns to the eyes and permanent damage. High concentrations of vapor may cause severe breathing difficulties which may be delayed in onset (up to 30 hours).

CHRONIC: Repeated or prolonged exposure to mist or vapors may cause erosion of the exposed areas creating a yellowing effect.

NOTES TO PHYSICIAN: Refer to "Symptoms of Over Exposure, Inhalation Emergency and First Aid Procedures."

IV. REACTIVITY DATA

STABILITY: Stable- YES Unstable-
CONDITIONS TO AVOID - Excessive heat causes decomposition to toxic nitrogen oxides; NO, N_2O, N_2O_3, NO_2 and N_2O_4.

INCOMPATIBILITY (Materials to Avoid): Reacts explosively with metallic powders, carbides, hydrogen sulfide and turpentine. Increases the flammability of combustible, organic and readily oxidizable materials; can cause ignition of some of these materials.

CONDITIONS TO AVOID- N/A

HAZARDOUS DECOMPOSITION PRODUCTS: Oxides of nitrogen (NO, NO_2).

HAZARDOUS POLYMERIZATION: Will Occur- Will Not Occur- X

V. PHYSICAL AND CHEMICAL PROPERTIES

	BOILING POINT	MELTING POINT	VAPOR DENSITY	EVAPORATION	pH
68-85%	245-252 F. 118-122 C.	- 4 to -30F. -20 to -34C.	1.3 (Air = 1) X Heavier than Air Lighter than Air	N/A (Butyl Acetate =1) Faster Than Butyl Slower	< 1
45-67%	245-252 F. 118-122 F.	- 4 to -30F. -20 to -34C.	1.3	N/A	< 1
20-44%	218-252 F. 103-113 C.	-0.5 to -22F. -1.75 to -30C.	1.3	N/A	< 1

	SPECIFIC GRAVITY	MOLECULAR WEIGHT	PERCENT VOLATILES (by volume)	VAPOR PRESSURE
68-85%	1.38-1.44 (Water =1) Yes-Heavier than water Lighter than water	63	100	7 mm Hg @ 68F.
45-67%	1.35-1.41	63	100	7 mm Hg @ 68F.
20-44%	1.118-1.246	63	100	7 mm Hg @ 68F.

APPEARANCE AND ODOR

Water white to slightly yellow liquid with characteristic NO_2 odor (acrid). Darkens to brownish color on aging or exposure to light.

VI. HANDLING AND STORAGE PRECAUTIONS

HANDLING AND STORAGE PRECAUTIONS: Store in tightly closed containers in a clean, cool, well-ventilated area away from organic chemicals, strong bases, metal powders, carbides, sulfides, and any readily oxidizable materials. Protect from direct sunlight. Handle only when properly protected.

VII. FIRE PROTECTION INFORMATION

NEPA FIRE HAZARD RATING	FLASHPOINT	FLAMMABLE LIMITS (by volume in Air)	LOWER EXPLOSIVE	UPPER EXPLOSIVE
Flammability- 0 Health Hazard- 3 Specific Hazard- Oxidizer Reactivity- 0	N/A	N/A	N/A	N/A

AUTOIGNITION TEMPERATURE

N/A

HAZARD KEY:
Least- 0 Slight- 1
Moderate-2 High- 3
Extreme- 4

EXTINGUISHING MEDIA: WATER FOG

SPECIAL FIRE FIGHTING PROCEDURES: Self-contained apparatus with full face piece and full body protective clothing required when NITRIC ACID is involved in the fire. Use fire fighting agent suitable to surrounding material. The acid itself burns with difficulty.

USUAL FIRE AND EXPLOSION HAZARDS: Noncombustible but dangerously reactive with many materials. Fire may produce poisonous or irritating gas, fumes or vapor. Exposed firefighters should wear MSHA/NIOSH approved self-contained breathing apparatus, with full mask and full protective equipment.

VIII. TRANSPORTATION REQUIREMENTS

DEPARTMENT OF TRANSPORTATION CLASSIFICATION: As of October 1993, the proper DOT classification will be CORROSIVE rather than OXIDIZER

PROPER D.O.T SHIPPING DESCRIPTION REQUIRES ONE OF THE FOLLOWING:

NITRIC ACID (Other than red fuming with more than 70% nitric acid)
HAZARD CLASS - 8
IDENTIFICATION NUMBER - UN 2031
PACKING GROUP - PG 1

NITRIC ACID (Other than red fuming with not more than 70% nitric acid)
HAZARD CLASS - 8
IDENTIFICATION NUMBER - UN 2031
PACKING GROUP - PG 11

EMERGENCY RESPONSE GUIDE: #44

NITRIC ACID - NOT MORE THAN 40%
INDENTIFICATION NUMBER - UN 1760

EMERGENCY RESPONSE GUIDE: #60

OTHER REQUIREMENTS: Shipping containers must meet DOT specifications for NITRIC ACID and carry the CORROSIVE labels.

IX. ENVIRONMENTAL PROTECTION (In the Event of a Spill or Release)

ENVIRONMENTAL IMPACT: Releases to streams may kill aquatic life and pose potentially severe environmental impact.

PRECAUTIONS IF MATERIAL IS RELEASED OR SPILLED:

SMALL SPILL: Cover the contaminated surface with sodium bicarbonate or a soda ash/slaked lime mixture (50-50). Mix and add water if necessary to form a slurry. Scoop up slurry and wash site with soda ash solution.

LARGE SPILL: Eliminate all ignition sources (flares, flames including pilot lights, electrical sparks). Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed. Stop spill at source, dike area of spill to prevent spreading, pump liquid to salvage tank. Remaining liquid may be taken up on sand, earth, clay, or inorganic floor absorbent and shoveled into containers.

NEUTRALIZING CHEMICALS: Sodium Bicarbonate or Soda Ash/Slaked Lime (50-50).

WASTE DISPOSAL METHODS: If uncontaminated, recover and reuse as product. Consult state or federal environmental regulatory agencies for acceptable disposal procedures and disposal locations. Disposal in streams or sewers is contrary to regulations. If contaminated with other materials, the nature and extent of contamination may require use of special disposal methods.

REPORTABLE QUANTITIES: 1000 lbs.

"This product contains
NITRIC ACID *
---
which is a chemical regulated under Section 313 of S.A.R.A. Title III."
***(refer to prod. specs. for exact %)**

DISCLAIMER

VIGORO INDUSTRIES believes that the information contained in this MATERIAL SAFETY DATA SHEET is accurate as of the date indicated. VIGORO, however, makes no warranty, expressed or implied, as to either the accuracy of the information or the properties, fitness or safety of the chemical identified in Part I, and assumes no liability or responsibility in connection with the information contained herein or as a result of the use of this MATERIAL SAFETY DATA SHEET. This MATERIAL SAFETY DATA SHEET applies only to the chemical described and may not be valid if the chemical is altered, combined with another substance, or subjected to physical or chemical processes. Each company or person using or distributing this MATERIAL SAFETY DATA SHEET is responsible for insuring its accuracy, applicability and suitability at the time and under the particular circumstances of use or distribution.

OxyChem®

Responsible Care:® A Public Commitment

MATERIAL SAFETY DATA SHEET

MSDS NUMBER : M32415

MSDS DATE : 11-23-93

PRODUCT NAME : CAUSTIC SODA LIQUID (ALL GRADES)

(For specific products - see Section XI)

24 HOUR EMERGENCY PHONE: 1-800-733-3665 OR 716-278-7021

I. PRODUCT IDENTIFICATION

HMIS HAZARD RATINGS

HEALTH HAZARD 3 **FIRE HAZARD 0** **REACTIVITY 2**

Based on the National Paint & Coatings Association HMIS rating system.

SARA/TITLE III HAZARD CATEGORIES (See Section X)

Immediate (ACUTE) Health: YES
Delayed (Chronic) Health: NO
Fire Hazard: NO
Reactive Hazard: YES
Sudden Release of Pressure: NO

MANUFACTURER'S NAME AND ADDRESS: Occidental Chemical Corporation, Customer Service, Occidental Tower, P O Box 809050, Dallas, Texas 75380 — Telephone (1-800-752-5151)

CHEMICAL NAME: Sodium Hydroxide CAS NUMBER: 1310-73-2

SYNONYMS/COMMON NAMES: Sodium Hydroxide; NaOH

CHEMICAL FORMULA: NaOH

DOT PROPER SHIPPING NAME: Sodium Hydroxide, Solution

DOT HAZARD CLASS: 8

DOT IDENTIFICATION NUMBER: UN1824

DOT PACKING GROUP: II

DOT HAZAROUS SUBSTANCE: RQ 1000 lbs. (Sodium Hydroxide)

DOT MARINE POLLUTANT: NA

ADDITIONAL DESCRIPTION REQUIREMENT: NA

II. HEALTH HAZARD INFORMATION

EMERGENCY AND FIRST AID PROCEDURES

EYES:

OBJECT IS TO FLUSH MATERIAL OUT IMMEDIATELY THEN GET MEDICAL ATTENTION, IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes, holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN:

IMMEDIATELY wash with plenty of water for at least 15 minutes. Remove contaminated clothing and footwear. Wash clothing before reuse and discard footwear which cannot be decontaminated. GET MEDICAL ATTENTION IMMEDIATELY.

INHALATION:

Remove to fresh air. If breathing is difficult have trained person administer oxygen. If respiration stops, give mouth-to-mouth resuscitation. GET MEDICAL ATTENTION.

INGESTION:

NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. If available, give several glasses of milk. If vomiting occurs spontaneously, keep airway clear. GET MEDICAL ATTENTION IMMEDIATELY.

ROUTES OF EXPOSURE

INHALATION:

Breathing dust, mist or spray may cause damage to the upper respiratory tract and lung tissue proper which could produce chemical pneumonia, depending upon severity of exposure.

SKIN:

Contact produces severe burns and destroys tissues. Irritation may be delayed.

EYE CONTACT:

Causes severe burns that result in damage to the eyes and possibly blindness.

INGESTION:

Causes severe burns to mucous membranes of the mouth, throat, esophagus, and stomach.

EFFECTS OF OVEREXPOSURE

ACUTE:

Corrosive to all body tissues by all routes of exposure. The effect of local dermal exposure may consist of multiple areas of superficial destruction of the skin or of primary irritant dermatitis. Similarly, inhalation of dust, spray, or mist may result in varying degrees of irritation or damage to the respiratory tract tissues and an increased susceptibility to respiratory illness.

CHRONIC:

No known chronic effects.

II. HEALTH HAZARD INFORMATION (Continued)

TOXICOLOGY DATA:

Caustic soda is a corrosive material.

Sodium Hydroxide:

Acute dermal LD50	(rabbit)	1350 mg/kg

Human Dermal Exposure

Regardless of concentrations, the severity of damage and extent of its irreversibility increases with length of contact time. Prolonged contact with sodium hydroxide solutions of =>1% can cause a high degree of tissue destruction. The latent period, following skin contact during which no sensation of irritation occurs, varies from several hours for 0.4 - 4% solution to 3 minutes with concentrations of 25% or greater.

III. IMPORTANT COMPONENTS

CAS NUMBER / NAME
7732185 Water

EXPOSURE LIMITS
PEL:Not Established
TLV:Not Established

PERCENTAGE
VOL ND
WT 48.50-91

COMMON NAMES:

Listed On(List Legend Below):
19 23

1310732 Sodium hydroxide (Na(OH))

EXPOSURE LIMITS
PEL:2 mg/m3, Ceiling
TLV:2 mg/m3, Ceiling

PERCENTAGE
VOL ND
WT 9-51.50

COMMON NAMES:
CAUSTIC SODA

Listed On(List Legend Below):
13 18 21

7647145 Sodium chloride (NaCl)

EXPOSURE LIMITS
PEL:None established
TLV:None established

PERCENTAGE
VOL ND
WT 0-1.30

COMMON NAMES:
SALT

Listed On(List Legend Below):
23

7775099 Chloric acid, sodium salt

EXPOSURE LIMITS
PEL:Not Established
TLV:Not Established

PERCENTAGE
VOL ND
WT 0-0.30

COMMON NAMES:
SODIUM CHLORATE

Listed On(List Legend Below):
12 21

All components of this product that are required to be on the TSCA Inventory are listed on the inventory.

Not listed as carcinogen - IARC, NTP, OSHA

LIST LEGEND

12 PA HAZARDOUS SUBSTANCE
13 PA ENVIROMENTAL HAZ SUBSTANCE
18 NY HAZARDOUS SUBSTANCES
19 PA REQUIREMENT- 3% OR GREATER
21 NJ SPECIAL HEALTH HAZ SUB
23 NJ REQUIREMENT- 1% OR GREATER

IV. FIRE AND EXPLOSION DATA

FLASH POINT: NA AUTOIGNITION TEMPERATURE: Nonflammable

FLAMMABLE LIMITS IN AIR, % BY VOLUME- UPPER: NA
LOWER: NA

EXTINGUISHING MEDIA:

This product is not combustible. Foam, carbon dioxide or dry chemical may be used where this product is stored.

SPECIAL FIRE FIGHTING PROCEDURES:

Wear full protective clothing. Avoid direct contact of this product with water as this can cause a violent exothermic reaction.

UNUSUAL FIRE AND EXPLOSION HAZARD:

Direct contact with water can cause a violent exothermic reaction. See Reactivity Section.

V. SPECIAL PROTECTION

VENTILATION REQUIREMENTS:

Special ventilation is not required under normal use. Use local exhaust ventilation where dust, mist, or spray may be generated.

NOTE: Where carbon monoxide or other reaction products may be generated, special ventilation may be required.

SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY:

Respiratory protection is not required under normal use. Use NIOSH/MSHA approved respirators where dust, mist, or spray may be generated.

EYE:

Wear chemical safety goggles plus full face shield to protect against splashing (ANSI Z87.1).

GLOVES:

Wear chemical resistant gloves such as natural or butyl rubber. Gloves may be decontaminated by washing with mild soap and water.

OTHER CLOTHING AND EQUIPMENT:

Impervious protective clothing and chemically resistant safety shoes should be worn to minimize contact. Wash contaminated clothing with soap and water and dry before reuse. Emergency shower and eyewash facility should be in close proximity. (ANSI Z358.1).

VI. PHYSICAL DATA

PHYSICAL STATE: LIQUID	Concentration, Weight % 10	20	30	40	50
BOILING POINT,@ 760 mm Hg, °C:	110	113	119	129	144
FREEZING POINT, °C:	-10	-32	0	15	12
VAPOR PRESSURE, mm Hg @ 60°C:	135	110	76	46	13
SPECIFIC GRAVITY @15.6°C/15.6°C:	1.11	1.22	1.33	1.43	1.53
DENSITY, lbs/gallon @ 15.6°C/15.6°C:	9.27	10.20	11.11	11.97	12.76
SOLUBILITY IN H2O, % by Wt.	.....completely soluble.....				
VAPOR DENSITY (Air = 1):	Not Applicable				
APPEARANCE AND ODOR:	Clear liquid with no distinct odor				
ODOR THRESHOLD (PPM):	Not Available				
EVAPORATION RATE:	Not Known				
COEFFICIENT WATER/OIL DISTRIBUTION:	Not Available				
pH:	7.5% solution has pH 14.0				

VII. REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY:

Under normal conditions, this product is stable.

INCOMPATIBILITY:

See Handling and Storage Section. Avoid contact with water. This product may be added slowly to water or acids with dilution and agitation to avoid a violent exothermic reaction. When handling this product, avoid contact with aluminum, tin, zinc, and alloys containing these metals. Do not mix with strong acids without dilution and agitation to prevent violent or explosive reaction. Avoid contact with leather, wool, acids, organic halogen compounds and organic nitro compounds.

HAZARDOUS DECOMPOSITION PRODUCTS:

None known.

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION:

Material is not known to polymerize.

VIII. HANDLING AND STORAGE

HANDLING AND STORAGE PRECAUTIONS:

Do not get into eyes, on skin, on clothing.
Avoid breathing dust, mists, or spray.
Do not take internally.
Use with adequate ventilation and wear respiratory protection when exposure to dust, mist or spray is possible.
When handling, wear chemical splash goggles, face shield, rubber gloves and protective clothing.
Wash thoroughly after handling or contact - exposure can cause burns which are not immediately painful or visible.
Keep container closed.
Product can react violently with water, acids, and other substances - read Special Mixing and Handling Instructions below carefully before using.
Product is corrosive to tin, aluminum, zinc and alloys containing these metals, and will react violently with these metals in powder form.
Hazardous carbon monoxide gas can form upon contact with food and beverage products in enclosed spaces and can cause death. Follow appropriate tank entry procedures (ANSI Z117.1).

SPECIAL MIXING AND HANDLING INSTRUCTIONS

Product can react violently with water. Considerable heat is generated when product is mixed with water. Therefore, when making solutions always carefully follow these steps:

ALWAYS wear ALL protective clothing described above. NEVER add water to product. ALWAYS add product - with constant stirring - slowly to surface of lukewarm (80-100°F) water, to assure product is being completely dissolved as it is added.

If product is added too rapidly, or without stirring, and becomes concentrated at bottom of mixing vessel, excessive heat may be generated, resulting in DANGEROUS boiling and spattering, and a possible IMMEDIATE AND VIOLENT ERUPTION of highly caustic solution.

NOTE: Never add more product than can be absorbed by solution while maintaining temperature below 200°F (@ sea level) to prevent boiling and spattering.

Product can react EXPLOSIVELY with acids, aldehydes, and many other organic chemicals - when mixing product with solutions containing such chemicals, follow all of above mixing instructions, and add product very gradually, while stirring constantly.

ALWAYS empty and clean containers of all residues before adding product, to avoid possible EXPLOSIVE reaction between product and unknown residue.

Returnable containers should be shipped in accordance with supplier's recommendations. Return shipments should comply with all federal, state, and DOT regulations. All residual caustic soda should be removed from containers prior to disposal.

IX. ENVIRONMENTAL PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

Leaks should be stopped. Spills should be contained and cleaned up immediately. Spills should be removed by using a vacuum truck. Neutralize remaining traces of material with any dilute inorganic acid such as hydrochloric, sulfuric, nitric, phosphoric, and acetic acid. The spill area should then be flushed with water followed by liberal covering of sodium bicarbonate. All clean-up material should be removed and placed in approved containers, labeled and stored in a safe place to await proper treatment or disposal. Spills on areas other than pavement, e.g., dirt or sand, may be handled by removing the affected soils and placing in approved containers. Persons performing clean-up work should wear adequate personal protective equipment and clothing. Spills or releases should be reported, if required, to the appropriate local, state and federal regulatory agencies.

CAUTION: Caustic soda may react violently with acids and water.

WASTE DISPOSAL METHOD:

The materials resulting from clean-up operations may be hazardous wastes and, therefore, subject to specific regulations. Package, store, transport, and dispose of all clean-up materials and any contaminated equipment in accordance with all applicable federal, state, and local health and environmental regulations. Shipments of waste materials may be subject to manifesting requirements per applicable regulations. Appropriate disposal will depend on the nature of each waste material and should be performed by competent and properly permitted contractors. Ensure that all responsible federal, state, and local agencies receive proper notification of spill and disposal methods.

X. ADDITIONAL INFORMATION

OSHA Standard 29CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a hazard communication program including labeling, material safety data sheets, training and access to written records. We request that you, and it is your legal duty to, make all information in this Material Safety Data Sheet available to your employees.

To aid our customers in complying with regulatory requirements, SARA Title III hazard categories for this product are indicated in Section I. If the word "YES" appears next to any category, this product may be reportable by you under the requirements of 40 CFR Part 370. Please consult those regulations for details.

XI. PREPARATION INFORMATION

For additional Non-Emergency health, safety, or environmental information telephone (716) 286-3081, or write to:

Occidental Chemical Corporation
Product Stewardship Department
360 Rainbow Boulevard South
Niagara Falls, NY 14302

For Emergencies: 24 HOUR EMERGENCY PHONE: 1-800-733-3665

To request an MSDS: 716-286-3400

This Material Safety Data Sheet (MSDS) covers the following materials

- DIAPHRAGM 50%
- RAYON 18%
- DIAPHRAGM 73%
- PURIFIED 50%
- DIAPHRAGM 9%
- DIAPHRAGM 21%
- DIAPHRAGM 30%
- DIAPHRAGM 10%
- RAYON 15%
- RAYON 10%
- RAYON 30%
- DIAPHRAGM 20%
- DIAPHRAGM 45%
- MEMBRANE 30%
- DIAPHRAGM 24%
- 601W
- RAYON 25%
- SOLUTION 50%
- MEMBRANE 50%
- RAYON 50%
- DIAPHRAGM 19%
- DIAPHRAGM 25%
- DIAPHRAGM 18%
- DIAPHRAGM 15%
- RAYON 17%
- RAYON 14%
- RAYON 20%
- DIAPHRAGM 35%
- DIAPHRAGM 28%
- LIQUID
- 601

WARNING LABEL INFORMATION

SIGNAL WORD: DANGER

STATEMENT OF HAZARDS:

CAUSES SEVERE BURNS TO SKIN, EYES AND MUCOUS MEMBRANES.
CONTACT WITH EYES CAN CAUSE PERMANENT EYE DAMAGE.
INHALATION OF DUST, MIST, OR SPRAY CAN CAUSE SEVERE LUNG DAMAGE.
CAN REACT VIOLENTLY WITH WATER, ACIDS, AND OTHER SUBSTANCES.

PRECAUTIONARY STATEMENTS:

Do not get into eyes, on skin, on clothing.
Avoid breathing dust, mist, or spray.
Do not take internally.
Use with adequate ventilation and wear respiratory protection when exposure to dust, mist, or spray is possible.
When handling, wear chemical splash goggles, face shield, rubber gloves and protective clothing.
Wash thoroughly after handling or contact - exposure can cause burns which are not immediately painful or visible.
Keep container closed.
Product can react violently with water, acids, and other substances - read Handling and Storage instructions carefully before using.
Product is corrosive to tin, aluminum, zinc, and alloys containing these metals, and will react violently with these metals in powder form.
Hazardous carbon monoxide gas can form upon contact with food and beverage products in enclosed spaces and can cause death. Follow appropriate tank entry procedures.

FIRST AID:

FOR EYES:

OBJECT IS TO FLUSH MATERIAL OUT IMMEDIATELY THEN GET MEDICAL ATTENTION. IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes, holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

FOR SKIN:

IMMEDIATELY wash with plenty of water for at least 15 minutes. Remove contaminated clothing and footwear. Wash clothing before reuse and discard footwear which cannot be decontaminated. GET MEDICAL ATTENTION IMMEDIATELY.

IF INHALED:

Remove to fresh air. If breathing is difficult, have trained person administer oxygen. If respiration stops, give mouth-to-mouth resuscitation. GET MEDICAL ATTENTION.

IF SWALLOWED:

NEVER GIVE ANYTHING NY MOUTH TO AN UNCONSCIOUS PERSON. If swallowed, DO NOT INDUCE VOMITING . Give large quantities of water. If available, give several glasses of milk. If vomiting occurs spontaneously, keep airway clear. GET MEDICAL ATTENTION IMMEDIATELY.

IN CASE OF:
SPILL OR LEAK:

Leaks should be stopped. Spills, after containment, should be shoveled up or removed by vacuum truck (if liquid) to chemical waste area. Neutralize residue with dilute acid, flush spill area with water followed by liberal covering of sodium bicarbonate. Dispose of wash water and spill by-products according to federal, state, and local regulations.

WARNING LABEL INFORMATION (Continued)

HANDLING AND STORAGE:

Considerable heat is generated when product is mixed with water. Therefore, when making solutions always carefully follow these steps:

ALWAYS wear ALL prescribed protective clothing. NEVER add water to product. ALWAYS add product - with constant stirring - slowly to surface of lukewarm (80-100°F) water, to assure product is being completely dissolved as it is added.

If product is added too rapidly, or without stirring, and becomes concentrated at bottom of mixing vessel, excessive heat may be generated, resulting in DANGEROUS boiling and spattering, and a possible IMMEDIATE AND VIOLENT ERUPTION of highly caustic solution.

NOTE: Never add more product than can be absorbed by solution while maintaining temperature below 200°F (@ sea level) to prevent boiling and spattering.

Product can react EXPLOSIVELY with acids, aldehydes, and many other organic chemicals - when mixing product with solutions containing such chemicals, follow all of above mixing instructions, and add product very gradually, while stirring constantly.

ALWAYS empty and clean containers of all residues before adding product, to avoid possible EXPLOSIVE reaction between product and unknown residue.

Returnable containers should be shipped in accordance with supplier's recommendations. Return shipments should comply with all federal, state, and DOT regulations. All residual caustic soda should be removed from containers prior to disposal.

DISPOSAL:

The materials resulting from clean-up operations may be hazardous wastes and, therefore, subject to specific regulations. Package, store, transport, and dispose of all clean-up materials and any contaminated equipment in accordance with all applicable federal, state, and local health environmental regulations. Shipments of waste materials may be subject to manifesting requirements per applicable regulations. Appropriate disposal will depend on the nature of each waste material and should be performed by competent and properly permitted contractors. Ensure that all responsible federal, state, and local agencies receive proper notification of disposal.

INFORMATION REQUIRED BY FEDERAL, STATE OR LOCAL REGULATIONS:

This product contains:

CAS#	NAME
7732185	Water
1310732	Sodium hydroxide (Na(OH))
7647145	Sodium chloride (NaCl)
7775099	Chloric acid, sodium salt

HMIS RATING SYSTEM: HEALTH 3 FLAMMABILITY 0 REACTIVITY 2

FOR INDUSTRIAL USE ONLY **LABEL 113M32415**

COULTON CHEMICAL COMPANY
6600 SYLVANIA AVENUE
SYLVANIA, OHIO 43560-3997
(419) 885-4661 FAX (419) 882-8045

MATERIAL SAFETY DATA SHEET

PRODUCT: SULFURIC ACID, CONCENTRATED

DATE: JUNE 1, 1993 (Supersedes Issue of May 1, 1993)

SECTION 1: MATERIAL IDENTIFICATION

Chemical Name: Sulfuric Acid
Synonyms: Oil of Vitriol, Battery Acid, Hydrogen Sulfate
Chemical Formula: H_2SO_4
CAS Number: 7664-93-9
DOT Shipping Description: RQ, Sulfuric Acid, 8, UN 1830, PG II
DOT Hazard: Corrosive Material
Label: Corrosive

HMIS	
H:	3
F:	0
R:	2

NFPA

Manufacturer: Coulton Chemical Company
6600 Sylvania Avenue
Sylvania, Ohio 43560
Phone: 419-885-4661
Emergency 24 Hour Phone: 419-698-8181 or
CHEMTREC® 800-424-9300 day or night

SECTION 2: INGREDIENTS AND HAZARDS

Sulfuric Acid	93-99.5%
Water	7-0.5%

SECTION 2B: EXPOSURE STANDARDS

MSHA STD - AIR: TWA 1 mg/m^3
OSHA PEL: 8H TWA 1 mg/m^3
NIOSH IDLH: 80 mg/m^3

SECTION 2C: TOXICITY DATA

Inhalation; human; TCL_o : 3mg/m^3 /24W; Musculoskeletal (Changes in teeth and supporting structures.)
Oral; man; LDL_o : 135 mg/Kg: Details not reported.

SECTION 3: PHYSICAL DATA

	93.2% H_2SO_4	98.2% H_2SO_4
Boiling Point: 1 atm, °F	518	640
Specific Gravity: (60/60°F)	1.8357	1.84
Freezing Point: °F	-30	+37

Miscible with water
Clear, Colorless, Oily Liquid
Non-Flammable

SECTION 4: FIRE AND EXPLOSION DATA

Sulfuric acid is nonflammable. However, dilute sulfuric acid will react with most metals to liberate hydrogen gas which can reach flammable or explosive limits if allowed to collect. Concentrated sulfuric acid will react with many organic materials and may cause fire due to the reaction heat. If water is added to concentrated acid a severe eruption may result, especially if the quantities involved are large.

SECTION 5: REACTIVITY DATA

Sulfuric acid does not polymerize. It is stable if stored properly. It is a mineral acid that will react strongly with bases and most organic materials. If sulfuric acid is diluted it will rapidly corrode most metals. Even normal corrosion by concentrated acid generates hydrogen gas which will slowly pressurize closed containers.

In use, sulfuric acid should always be diluted by adding acid slowly to water in order to control the heat generated by dilution. If water is added to strong acid, hazardous boiling and spattering may occur.

SECTION 6: HEALTH HAZARD INFORMATION

Sulfuric acid is not listed as a carcinogen by the NTP, IARC, OSHA. or ACGIH.

HEALTH HAZARDS: The International Agency for Research on Cancer (IARC) has classified "strong inorganic acid mists containing sulfuric acid" as a known human carcinogen (IARC Category 1). This classification applies only to mists containing sulfuric acid and not to sulfuric acid or sulfuric acid solutions. Debate continues in the scientific community as to whether or ot IARC adequately accounted for concomitant exposure to cigarette smoking, alcohol consumption and known chemical carcinogens when it made this classification. Inhalation of sulfuric acid mists can also damage the respiratory tract and lungs. Concentrated sulfuric acid is a strong dehydrating agent that will quickly damage human tissue, especially if hot. Eye injuries can be severe and permanent.

FIRST AID: EYES. Immediately flush eyes with water for at least 15 minutes. Flush under lids by lifting them or rolling eyes. See a doctor as soon as possible. SKIN. Flush with water immediately and continue for at least 15 minutes. Remove clothing quickly in the safety shower and continue flushing. INHALATION. Seek fresh air and restore normal breathing. INGESTION. Drink large volumes of milk or water followed by milk of magnesia pending medical attention. Avoid vomiting if possible.

SECTION 7: SPILL, LEAK AND DISPOSAL PROCEDURES

Minor spills can be diluted with lots of water and neutralized with soda ash, lime or caustic. Containment provisions for major spills and subsequent handling should be predetermined to conform with applicable laws and regulations and to insure the safety of personnel involved. Contact your supplier if you need additional information. Disposal should follow all environmental regulations:

EPA RQ is 1000# (40 CFR 117)

EPA Hazardous Waste # is D002 (40 CFR 261.22)

(For waste that is corrosive or less than 2 pH)

Sulfuric Acid is included under SARA Title III Section 313 Reporting requirements. Refer to purchasing information for specific concentration.

SECTION 8: SPECIAL PROTECTION INFORMATION

Provide ventilation to control exposure levels below airborne exposure limits. Spray from leaks, adding water to spills, or agitation of acid may generate mist levels requiring breathing protection. If a respirator is needed, follow OSHA respirator regulations (29 CFR 1910.134) and wear a NIOSH/MSHA approved respirator. Seek professional advice prior to respirator selection and use. In emergencies or non-routine operations where exposure levels are unknown or high, wear a self-contained breathing apparatus with full face piece operated in the positive pressure mode.

Protect eyes with chemical safety goggles and include a full face shield when splashing may occur. Wearing of contact lenses is not recommended. Protect the skin with acid resistant protective clothing such as a suit, boots, hood and gloves.

A safety shower, eyewash fountain, or other source of clean running water should be readily accessible.

SECTION 9: SPECIAL PRECAUTIONS AND COMMENTS

Store sulfuric acid drums in shaded, well drained storage areas. Do not add water to large amounts of concentrated sulfuric acid. Do not allow dilute acid (less than 70%) to contact metals. Most metals are rapidly corroded in weak sulfuric acid and explosive hydrogen is generated.

SECTION 10: APPLICABLE REGULATIONS AND REFERENCES

OSHA 29 CFR 1910.1000	Vapor Exposure Limit
OSHA 29 CFR 1910.94	Ventilation
OSHA 29 CFR 1910.134	Respiratory Protection
OSHA 29 CFR 1910.20	Records Access
OSHA 29 CFR 1910.132	Personal Protection Equipment
OSHA 29 CFR 1910.151	Medical Services and First Aid
OSHA 29 CFR 1910.133	Eye and Face Protection
OSHA 29 CFR 1910.1200	Hazard Communication
SARA TITLE III - 40 CFR 355 App.A,B	RQ and TPQ
SARA TITLE III - 40 CFR 372	Annual Release Reporting
FWPLA 40 CFR 117	RQ
CERCLA 40 CFR 302.4	RQ

Sulfuric acid is listed in TSCA Inventory and meets criteria for OSHA medical records rule. This is not a comprehensive list of regulations affecting handling or use of sulfuric acid.

The information and recommendations in this Material Safety Data Sheet are based upon data believed to be correct. However, the information is necessarily general in nature, and each purchaser must decide how or if it fits in his particular situation. Coulton Chemical Company extends no warranties and assumes no responsibility as to the accuracy or suitability of this information or for consequences of its use.

PREPARED BY: Richard K. Hansen

Richard K. Hansen - Technical Manager

For further information contact:
COULTON CHEMICAL COMPANY
6600 Sylvania Avenue
Sylvania, Ohio 43560

PHONE: 419-885-4661
24 HOUR: 419-698-8181

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P. O. Box 5
Fox River Grove, IL 60021-0005
Phone (708) 639 8910
Fax (708) 639 8911

24 Hr. Emergency No. - CHEMTREC 1-800-424-9300

SECTION I - PRODUCT INFORMATION

PRODUCT NAME: **KOBRA 104**

PRODUCT CLASS: Cleaner Solution

EFFECTIVE DATE: 06/01/94

MSDS # K0040 SUPERSEDES: N.A. First Issue PREPARED BY: MC

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	CAS #	WEIGHT	ACGIH TLV ppm (mg/m3)	OSHA PEL ppm (mg/m3)
Sodium Hydroxide	1310-73-2	LT 10%	2.0	2.0

LEGEND: LT-Less Than N.A-Not Applicable

SECTION III - HEALTH HAZARDS

CARCINOGENIC STATUS: None.

EXPOSURE LIMITS: Keep vapor concentrations below recommended permissible exposure levels, component TLV values.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P. O. Box 5
Fox River Grove, Illinois 60021

PRODUCT NAME: KOBRA 104

SECTION III - HEALTH HAZARDS (con't)

ROUTES OF ENTRY:	Eye and skin contact, ingestion, skin absorption and inhalation of mists or vapors.
ACUTE EFFECTS:	Extremely corrosive to all body tissues. Eye and skin contact, inhalation, and ingestion can cause severe irritation, burns, and ulcerations. Small quantities can cause permanent damage to eyes including blindness.
CHRONIC EFFECTS:	Will cause severe irritation, burns, and permanent damage to the eyes and all body tissue. Ingestion may cause injury to the mucus membranes and other tissue which may be fatal.

EMERGENCY FIRST AID PROCEDURES

INGESTION:	Do not induce vomiting. Drink large amounts of water. Contact physician for immediate medical attention.
EYE CONTACT:	Flush with water for at least 15 minutes. Contact physician for immediate medical attention.
SKIN CONTACT:	Flush with plenty of water for at least 15 minutes. Remove contaminated clothing. Contact physician for immediate medical attention. Wash clothing thoroughly before re-use.
INHALATION:	Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Contact physician at once for medical attention.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P. O. Box 5
Fox River Grove, IL 60021-0005

PRODUCT NAME: **KOBRA 104**

SECTION IV - PHYSICAL DATA

APPEARANCE AND ODOR:	Amber/Soap Odor
% VOLATILE BY WEIGHT:	N.A.
EVAPORATION RATE:	N.A.
SPECIFIC GRAVITY:	1.25
VAPOR DENSITY (AIR=1):	Greater than 1
SOLUBILITY IN WATER:	Complete
BOILING POINT:	Greater than 212 degree F
PH:	@ 5% greater than 12.0
VAPOR PRESSURE (mmHg):	N.A.

SECTION V - PHYSICAL HAZARDS

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:	N.A.
METHOD USED:	N.A.
FLAMMABLE LIMITS (% IN AIR):	N.A.
EXTINGUISHING MEDIA:	Carbon Dioxide, Water, Dry Chemical.
SPECIAL FIRE FIGHTING PROCEDURES:	Wear self contained breathing respirator apparatus.
UNUSUAL FIRE & EXPLOSION HAZARDS:	May generate explosive Hydrogen gas when in contact with Zinc, Aluminum, Tin, Magnesium, and other metals.

REACTIVITY DATA

STABILITY:	Stable under normal conditions.
CONDITIONS TO AVOID:	Avoid storage or contact with acidic materials or heat.
INCOMPATIBILITY:	Avoid contact with acid material and strong oxidizers.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P. O. Box 4
Fox River Grove, IL 60021-0005

PRODUCE NAME: **KOBRA 104**

REACTIVITY DATA (con't)

DECOMPOSITION PRODUCTS:	Will not occur.
HAZARDOUS POLYMERIZATION:	Will not occur under normal conditions.

SECTION VI - SPILL, LEAK, AND DISPOSAL PROCEDURES

Contain small spills and leaks with inert material or absorbents. Place clean up material in container for approved disposal. Large spills may be contained by diked area with inert materials, earth, or clay. Remove all contaminated material for proper approved disposal. Notify proper authorities. Never flush to sewer.

WASTE DISPOSAL METHOD: Dispose of according to Federal, State and Local regulations.

SECTION VII - PRECAUTIONS FOR SAFE USE AND HANDLING

RESPIRATORY PROTECTION: Use local or area mechanical room ventilation to reduce environmental concentrations to below permissible exposure levels. Respirators must be used when the permissible exposure levels may be exceeded. Use only MASHA/NIOSH approved air-purifying or supplied-air respirators.

SKIN PROTECTION: Use industrial type rubber or plastic gloves, aprons, and boots as required to protect all areas of possible skin contact.

EYE PROTECTION: Chemical goggles and full face shield should be worn.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P. O. Box 5
Fox River Grove, IL 60021-0005

PRODUCT NAME: **KOBRA 104**

SECTION VIII - SPECIAL PRECAUTIONS/ADDITIONAL INFORMATION

Store in tightly closed containers in a cool dry place away from acid materials and strong oxidizers.

SECTIONS IX - TRANSPORTATION

DOT PROPER SHIPPING NAME: Compound, Cleaning, Liquids
DOT HAZARD CLASSIFICATION: Corrosive Material
DOT HAZARD IDENTIFICATION NUMBER: NA 1760
HMIS RATINGS: Health:3 Flammability:0, Reactivity:2, Personal Protection:J

SECTION X - REGULATORY INFORMATION

Disposal of the product, or residues and waste material from this product should be made in compliance with Federal, State, and Local environmental laws.

CERCLA-SARA CLASSIFICATION: According to EPA hazard Categories of Section 311 and 312 of the Superfund Amendment and re-authorization Act of 1986 (SARA Title III) the following categories are as follows: IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD, REACTION HAZARD, FIRE HAZARD.

This product contains substances subject to the reporting requirements of SARA Section 313 of Title III and 40 CFR part 372.

This information is given without any warranty or representation. We do not assume any legal responsibility for same, nor do we give permission, inducement, or recommendation to practice any patented invention without a license. It is offered solely for your consideration, investigation, and verification. Before using any product, read its label.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, IL 60021-0005
Phone (708) 639-8910
Fax (708) 639-8911

24 Hr. Emergency No. - **CHEMTREC 1-800-424-9300**

SECTION I - PRODUCT INFORMATION

PRODUCT NAME: **KOBRA 520**

PRODUCT CLASS: Chromic Acid Solution

EFFECTIVE DATE: 03/08/94

MSDS # K0004 SUPERSEDES: N.A. First Issue PREPARED BY: MC

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	CAS #	WEIGHT	ACGIH TLV ppm (mg/m3)	OSHA PEL ppm mg/m3)
Chromic Acid	1333-82-0	LT 20%	0.05	0.1
Sodium Bichromate	7884-39-3	LT 20%	Not Established	
Nitric Acid	7697-37-2	LT 15%	5.0	5.0
Sulfuric Acid	7664-93-9	LT 10%	1.0	1.0

LEGEND: LT-Less Than N.A.-Not Applicable

SECTION III - HEALTH HAZARDS

CARCINOGENIC STATUS: Listed carcinogen (NTP, OSHA, IARC) NTP, Yes.

EXPOSURE LIMITS: Keep vapor concentrations below recommended permissible exposure levels, component TLV values.

ROUTES OF ENTRY: Eye and skin contact, ingestion, skin absorption and inhalation of mists or vapors.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P. O. Box 5
Fox River Grove, 60021-0005

PRODUCT NAME: **KOBRA 520**

SECTION III - HEALTH HAZARDS (con't)

ACUTE EFFECTS: Corrosive to all body tissues. Eye and skin contact, inhalation, and ingestion can cause severe irritation and burns. Inhalation, ingestion, and skin absorption can cause burns and nausea. Contact may cause ulceration of skin or chrome sores.

CHRONIC EFFECTS: Will cause severe irritation and possible permanent damage to the eyes. Prolonged or massive exposure may cause kidney failure and/or death.

EMERGENCY FIRST AID PROCEDURES

INGESTION: Do not induce vomiting. Drink large amounts of water. Contact Physician for immediate medical attention.

EYE CONTACT: Flush with water for at least 15 minutes. Contact Physician for immediate medical attention.

SKIN CONTACT: Flush with plenty of water for at least 15 minutes. Remove contaminated clothing. Contact Physician for immediate medical attention. Wash clothing thoroughly before reuse.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Contact Physician at once for medical attention.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, IL 60021-0005

PRODUCT NAME: **KOBRA 520**

SECTION IV - PHYSICAL DATA

APPEARANCE AND ODOR:	Red/Pungent Odor
% VOLATILE BY WEIGHT:	N.A.
EVAPORATION RATE:	N.A.
SPECIFIC GRAVITY:	1.22
VAPOR DENSITY (AIR=1):	Greater than 1
SOLUBILITY IN WATER:	Complete
BOILING POINT:	Greater than 212 Degree F
PH:	@ 5%, 1-3
VAPOR PRESSURE (mmHg):	N.A.

SECTION V - PHYSICAL HAZARDS

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:	N.A.
METHOD USED:	N.A.
FLAMMABLE LIMITS (% IN AIR):	N.A.
EXTINGUISHING MEDIA:	Carbon Dioxide, Water, Dry Chemical.
SPECIAL FIRE FIGHTING PROCEDURES:	Wear self contained breathing respirators apparatus.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	Heat and decomposition may produce hazardous vapor and foam. May generate explosive Hydrogen gas upon contact with most metals.

REACTIVITY DATA

STABILITY:	Stable under normal conditions.
CONDITIONS TO AVOID:	Avoid storage or contact with alkaline materials.
INCOMPATIBILITY:	Avoid materials which are easily oxidized, oils and organic materials.
DECOMPOSITION PRODUCTS:	Contact with Iron, Zinc, Aluminum, and other metals will generate explosive Hydrogen gas.
HAZARDOUS POLYMERIZATION:	Polymerization will not occur under normal storage and use conditions.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, IL 60021-0005

PRODUCT NAME: **KOBRA 520**

SECTION VI - SPILL, LEAK, AND DISPOSAL PROCEDURES

Contain small spills and leaks with inert material or absorbents. Place clean up material in container for approved disposal. Large spills may be contained by diked area with inert materials, earth, or clay. Remove all contaminated material for proper approved disposal. Notify proper authorities. Never flush to sewer.

WASTE DISPOSAL METHOD: Dispose of according to Federal, State and Local regulations.

SECTION VII - PRECAUTIONS FOR SAFE USE AND HANDLING

RESPIRATORY PROTECTION:	Use local or area mechanical room ventilation to reduce environmental concentrations to below permissible exposure levels. Respirators must be used when the permissible exposure levels may be exceeded. Use only MASHA/NIOSH approved air-purifying or supplied-air respirators.
SKIN PROTECTION:	Use industrial type rubber or plastic gloves, aprons, and boots as required to protect all areas of possible skin contact.
EYE PROTECTION:	Chemical goggles and full face shield should be worn.

SECTION VIII - SPECIAL PRECAUTIONS/ADDITIONAL INFORMATION

Store in tightly closed containers in a cool dry place away from alkaline and organic materials.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, IL 60021-0005

PRODUCT NAME: KOBRA 520

SECTION IX - TRANSPORTATION

DOT PROPER SHIPPING NAME:	Chromic Acid Solution N.O.S.
DOT HAZARD CLASSIFICATION:	Corrosive Material
DOT HAZARD IDENTIFICATION NUMBER:	NA1755

HMIS RATINGS: Health:3, Flammability:0, Reactivity:2, Personal Protection:J

SECTION X - REGULATORY INFORMATION

Disposal of the product, or residues and waste material from this product should be made in compliance with Federal, State, and Local environmental laws.

CERLA-SARA CLASSIFICATION: According to EPA hazard Categories of Section 311 and 312 of the Superfund Amendment and reauthorization Act of 1986 (SARA Title III) the following categories are as follows: IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD, REACTION HAZARD, FIRE HAZARD.

This product contains substances subject to the reporting requirements of SARA Section 313 of Title III and 40 CFR part 372.

Attn: Harry Bobb

MATERIAL SAFETY DATA SHEET

KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, IL 60021-0005
Phone (708) 639-8910
Fax (708) 639-8911

24 Hr. Emergency No. - **CHEMTREC 1-800-424-9300**

SECTION I - PRODUCT INFORMATION

PRODUCT NAME: **KOBRA 503**

PRODUCT CLASS: Chromic Acid Solution

EFFECTIVE DATE: 03/08/94

MSDS # K0011 SUPERSEDES: N.A. First Issue PREPARED BY: MC

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	CAS #	WEIGHT	ACGIH TLV ppm (mg/m3)	OSHA PEL ppm mg/m3)
Chromic Acid	1333-82-0	LT 5%	0.05	0.1
Nitric Acid	7697-37-2	LT 40%	5.0	5.0
Ammonium Bifluoride	1341-49-7	LT 5%	2.5	2.5

LEGEND: LT-Less Than N.A.-Not Applicable

SECTION III - HEALTH HAZARDS

CARCINOGENIC STATUS: Listed carcinogen (NTP, OSHA, IARC) NTP, Yes.

EXPOSURE LIMITS: Keep vapor concentrations below recommended permissible exposure levels, component TLV values.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P. O. Box 5
Fox River Grove, 60021-0005

PRODUCT NAME: **KOBRA 503**

SECTION III - HEALTH HAZARDS (con't)

ROUTES OF ENTRY:	Eye and skin contact, ingestion, skin absorption and inhalation of mists or vapors.
ACUTE EFFECTS:	Corrosive to all body tissues. Eye and skin contact, inhalation, and ingestion can cause severe irritation and burns. Inhalation, ingestion, and skin absorption can cause burns and nausea. Contact may cause ulcertation of skin or chrome sores.
CHRONIC EFFECTS:	Will cause severe irritation and possible permanent damage to the eyes. Prolonged or massive exposure may cause kidney failure and or death.

EMERGENCY FIRST AID PROCEDURES

INGESTION:	Do not induce vomiting. Drink large amounts of water. Contact Physician for immediate medical attention.
EYE CONTACT:	Flush with water for at least 15 minutes. Contact Physician for immediate medical attention.
SKIN CONTACT:	Flush with plenty of water for at least 15 minutes. Remove contaminated clothing. Contact Physician for immediate medical attention. Wash clothing thoroughly before reuse.
INHALATION:	Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Contact Physician at once for medical attention.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, IL 60021-0005

PRODUCT NAME: **KOBRA 503**

SECTION IV - PHYSICAL DATA

APPEARANCE AND ODOR:	Red/Pungent Odor
% VOLATILE BY WEIGHT:	N.A.
EVAPORATION RATE:	N.A.
SPECIFIC GRAVITY:	1.21
VAPOR DENSITY (AIR=1):	Greater than 1
SOLUBILITY IN WATER:	Complete
BOILING POINT:	Greater than 212 Degree F
PH:	@ 5%, 1-3
VAPOR PRESSURE (mmHg):	N.A.

SECTION V - PHYSICAL HAZARDS

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:	N.A.
METHOD USED:	N.A.
FLAMMABLE LIMITS (% IN AIR):	N.A.
EXTINGUISHING MEDIA:	Carbon Dioxide, Water, Dry Chemical.
SPECIAL FIRE FIGHTING PROCEDURES:	Wear self contained breathing respirators apparatus.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	Heat and decomposition may produce hazardous vapor and foam. May generate explosive Hydrogen gas upon contact with most metals.

REACTIVITY DATA

STABILITY:	Stable under normal conditions.
CONDITIONS TO AVOID:	Avoid storage or contact with alkaline materials.
INCOMPATIBILITY:	Avoid materials which are easily oxidized, oils and organic materials.
DECOMPOSITION PRODUCTS:	Contact with Iron, Zinc, Aluminum, and other metals will generate explosive Hydrogen gas.
HAZARDOUS POLYMERIZATION:	Polymerization will not occur under normal storage and use conditions.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, IL 60021-0005

PRODUCT NAME: **KOBRA 503**

SECTION VI - SPILL, LEAK, AND DISPOSAL PROCEDURES

Contain small spills and leaks with inert material or absorbents. Place clean up material in container for approved disposal. Large spills may be contained by diked area with inert materials, earth, or clay. Remove all contaminated material for proper approved disposal. Notify proper authorities. Never flush to sewer.

WASTE DISPOSAL METHOD: Dispose of according to Federal, State and Local regulations.

SECTION VII - PRECAUTIONS FOR SAFE USE AND HANDLING

RESPIRATORY PROTECTION:	Use local or area mechanical room ventilation to reduce environmental Concentrations to below permissible exposure levels. Respirators must be used when the permissible exposure levels may be exceeded. Use only MASHA/NIOSH approved air-purifying or supplied-air respirators.
SKIN PROTECTION:	Use industrial type rubber or plastic gloves, aprons, and boots as required to protect all areas of possible skin contact.
EYE PROTECTION:	Chemical goggles and full face shield should be worn.

M A T E R I A L S A F E T Y D A T A S H E E T

KOBRA PRODUCTS, INC.
P.O. Box 5
Fox River Grove, IL 60021-0005

PRODUCT NAME: **KOBRA 503**

SECTION VIII - SPECIAL PRECAUTIONS/ADDITIONAL INFORMATION

Store in tightly closed containers in a cool dry place away from alkaline and organic materials.

SECTION IX - TRANSPORTATION

DOT PROPER SHIPPING NAME: Chromic Acid Solution.
DOT HAZARD CLASSIFICATION: Corrosive Material
DOT HAZARD IDENTIFICATION NUMBER: UN 1755
HMIS RATINGS: Health:3, Flammability:0, Reactivity:2, Personal Protection:J

SECTION X - REGULATORY INFORMATION

Disposal of the product, or residues and waste material from this product should be made in compliance with Federal, State, and Local environmental laws.

CERLA-SARA CLASSIFICATION: According to EPA hazard Categories of Section 311 and 312 of the Superfund Amendment and reauthorization Act of 1986 (SARA Title III) the following categories are as follows: IMMEDIATE HEALTH HAZARD, CHRONIC HEALTH HAZARD, REACTION HAZARD, FIRE HAZARD.

This product contains substances subject to the reporting requirements of SARA Section 313 of Title III and 40 CFR part 372.

This information is given without any warranty or representation. We do not assume any legal responsibility for same, nor do we give permission, inducement, or recommendation to practice any patented invention without a license. It is offered solely for your consideration, investigation, and verification. Before using any product, read its label.

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
AMERICHEM MATERIAL SAFETY DATA SHEET #1005

May be used to comply with OSHA's Hazard Communication Standard
29 CFR 1910, 1200.
Standard must be consulted for specific requirements.
CAS NUMBER 143-33-9

SECTION I

MANUFACTURER'S NAME: Montedison
(Americhem as Distributor)
ADDRESS: 1114 Avenue of the Americas
New York, NY 10036
CHEMICAL NAME AND SYNONYMS:
Sodium Cyanide
CHEMICAL FAMILY: Cyanide

EMERGENCY TELEPHONE NUMBER:
Chemtrec -- 800-424-9300
Americhem - 215-335-0990
TRADE NAME AND SYNONYMS:
Cyanide of Sodium
FORMULA: NaCN

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES AND SOLVENTS	%	TLV (UNITS)	ALLOYS AND METALLIC COATINGS	%	TLV (UNITS)
PIGMENTS:	NA		BASE METAL: NaCN	99%	
CATALYST:	NA		ALLOYS:	NA	
VEHICLE:	NA		METALLIC COATINGS:	NA	
SOLVENTS:	NA		FILLER METAL PLUS COATING OR CORE FLUX:	NA	
ADDITIVES:	NA		OTHERS:	NA	

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS OR GASES: NA
PRINCIPLE HAZARDOUS COMPONENT: SODIUM CYANIDE 98%

SECTION III - PHYSICAL DATA

BOILING POINT (^{o}C): 1496^{o}C
SPECIFIC GRAVITY (H_2O=1): 1.6
VAPOR PRESSURE: (mm Hg.): 0.8 at 800^{o}C
PERCENT, VOLATILE BY VOLUME (%): NA
VAPOR DENSITY (AIR=1): 1.7
EVAPORATION RATE ( )=1: NA
SOLUBILITY IN WATER: 58.39/100g H_2O at 20^{o}C 31% MELTING POINT: 564^{o}C
APPEARANCE AND ODOR: White solid briquettes or irregular formed grains. Bitter almond-like odor.

(CONTINUED ON PAGE 2)

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED): None FLAMMABLE LIMITS: NA

EXTINGUISHING MEDIA: Dry Agents

SPECIAL FIRE FIGHTING PROCEDURES: Water containing cyanides (i.e. water used to fight nearby fires) should not be allowed to flow into sewer or water. Avoid using water if involved in fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Incombustible by itself. Cyanides liberate highly toxic and flammable hydrogen cyanide gas when in contact with acids or acidic salts. Carbon dioxide may liberate hydrogen cyanide.

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: OSHA PEL and TLV 5 mg/cu.m. (as CN) (CEILING) Refer ACGIH 1985-86.

EFFECTS OF OVEREXPOSURE: Highly toxic; May be rapidly fatal if swallowed or inhaled.

EMERGENCY AND FIRST AID PROCEDURES: Study and plan First Aid action before beginning work with cyanide — SEE ATTACHMENT.

SECTION VI - REACTIVITY DATA

STABILITY: Stable

INSTABILITY: Will react with acids to liberate highly toxic and flammable hydrogen cyanide gas.

INCOMPATABILITY (MATERIALS TO AVOID): Strong oxidizers (nitrates, chlorates), liquid or airborn acidic materials (acid, acid salts).

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrogen cyanide from reaction with acids.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: NA

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Collect spilled product with extreme caution in well closed containers. Decontaminate by alkaline oxidizing agents.

WASTE DISPOSAL METHOD: Dispose of in accordance with Federal, State and Local laws. Do not flush sodium cyanide into sewers which may contain an acid. If approved, neutralize with sodium or calcium hypochlorite and flush to waste water treatment system or call disposal contractor. After 24 hrs. dilute with plenty of water. Be sure cyanide is absent.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE): Approved respirator for dust or fumes.

VENTILATION: Local exhaust as needed to control exposures to below TLV level.

PROTECTIVE GLOVES: Rubber or neoprene.

EYE PROTECTION: Required for fumes, dust or heat.

OTHER PROTECTIVE EQUIPMENT: Wear coverall chemical safety goggles and/or face shield. Rubber gloves for solutions. Dry cotton gloves for dry material.

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SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Store in a dry place. Keep container closed and away from acids, weak alkaline salts and oxidizing agents. Do not store near foodstuffs. Need well ventilated area. Do not come in contact with water, moisture, or carbon dioxide.

OTHER PRECAUTIONS: Do not breathe dust or gas. Do not get in eyes. Avoid contact with skin. Do not carry foodstuffs, beverages or tobacco where contamination with cyanide is possible. Wash thoroughly after handling. Wash contaminated clothing before re-use.

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ATTACHMENT TO SODIUM CYANIDE MSD

FIRST AID FOR EXPOSURE TO CYANIDE

Always have on hand a Cyanide First Aid Kit and a Medical Supplies Kit. Carry patient to fresh air, have him lie down. Remove contaminated clothing, but keep patient warm. Start treatment immediately. Call a physician.

ANTIDOTE

IF GAS IS INHALED: Break an Amyl Nitrate Pearl in a cloth and hold lightly under nose for 15 seconds. Repeat 5 times at about 15 second intervals. Repeat as necessary using a fresh Amyl Nitrate Pearl every three minutes until 3 or 4 pearls have been given. Use artificial respiration if breathing has stopped.

IF SWALLOWED: Break an Amyl Nitrite Pearl in a cloth and hold lightly under nose for 15 seconds. If patient is conscious, or when consciousness returns, give patient one pint of 1% sodium thiosulfate solution (or soapy or mustard water) by mouth and induce vomiting. Repeat until vomit is clear. Call a physician. Repeat inhalation of Amyl Nitrate 5 times at about 15 second intervals. Repeat as necessary using a fresh Amyl Nitrate Pearl every three minutes until 3 or 4 pearls have been given. Use artificial respiration if breathing has stopped.

Never give anything by mouth to an unconscious person.

IN CASE OF EYE OR SKIN CONTACT: Immediately flush skin or eyes with plenty of water for at least 15 minutes. Call a physician.

IMC AMERICHEM
higher purity chemicals

5129 Unruh Avenue, Philadelphia, Pennsylvania 19135
Telex: 244417 Telefax: 215/624-3420
215/335-0990

January 1, 1989

"Section 313 Supplier Notification"

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372:

CAS #	Chemical Name	Percent by Weight
143-33-9	Cyanide Compounds	99.9%

This information must be included in all MSDSs that are copied and distributed for this material.

MATERIAL SAFETY DATA SHEET

Koala Corporation
1320 Greenfield Avenue S.W.
Canton, Ohio 44706
(216) 452-5759

Emergency Contact: Sales Manager
or your local poison control center.

Date of last revision 1/1/94

All information below is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or other warranty, expressed or implied, with respect to such information, and we assume no liability resulting from its use or misuse. Users should make their own investigation to determine the suitability of the information for their particular purpose.

SECTION 1 - MATERIAL IDENTIFICATION

CHEMICAL NAME	ZINC	CAS NO. 7440-66-6
TRADE NAME/SYNONYMS	SPECIAL HIGH GRADE ZINC SHG ZINC BALL ANODES SHG ZINC BAR ANODES SHG ZINC SLABS	
CHEMICAL FAMILY	ELEMENTARY METAL	

CHEMICAL FAMILY	ELEMENTARY METAL
MOLECULAR FORMULA	Zn
MOLECULAR WEIGHT	65.38

SECTION 2 - INGREDIENTS & HAZARDS

MATERIAL OR COMPONENT:	ZINC METAL
WEIGHT %	99.99
P E L	NOT LISTED
T L V	NOT LISTED

SUPERFUND AMENDMENTS & RESTORATION ACT - TITLE III APPLICABILITY

Section 312 40CFR 370.4	PHYSICAL HAZARD ____ Fire ___ Release of Pressure _____ Reactivity	HEALTH HAZARD __X__ Acute __X__ Chronic
Section 313 40 CFR 372.85	ZINC COMPOUNDS	

This material or the components of this material are included in the Toxic Chemical Inventory as required in section 8(B) of the Toxic Substance Control Act (Public Law 94-469) & is codified in 40 CFR 720

SECTION 3 - PHYSICAL DATA

BOILING POINT:	No Data	EVAPORATION RATE:	No Data
VAPOR PRESSURE:	N/A	SPECIFIC GRAVITY:	7.13
VAPOR DENSITY:	N/A	MELTING POINT:	788 DEG. F
APPEARANCE & ODOR:	Bluish-White Metallic Shapes		

SECTION 4 - FIRE & EXPLOSION DATA

FLASH POINT:	N/A
UEL:	N/A
LEL:	N/A
AUTOIGNITION:	No Data
EXTINGUISHING MEDIA:	Class D Fire Extinguisher, dry sand, or vermiculite. Water may be ineffective as an extinguishing agent, but water spray or fog may be used as a cooling agent for closed containers.
SPECIAL FIRE FIGHTING CONSIDERATIONS:	See Section 5 for decomposition products. When dealing with known or unknown thermal decomposition products the use of Self-contained breathing apparatus (SCBA) and structural fire fighter's protective clothing will provide limited protection.

SECTION 5 - REACTIVITY DATA

Material is STABLE under normal temperatures and pressures.

THERMAL DECOMPOSITION:	May release toxic & hazardous fumes and oxides of Zinc.
HAZARDOUS POLYMERIZATION:	Has not been reported to occur under normal temperatures and pressures.
INCOMPATIBLE MATERIAL(S):	Zinc Oxide - Chlorinated Rubber.
CONDITIONS TO AVOID:	See incompatible materials.

SECTION 6 - SPILL, LEAK, AND DISPOSAL INFORMATION

Cleanup personnel need not use respiratory protection or other protective clothing in responding to spills of this material. Provide adequate ventilation. Confine the spill to as small an area as possible. Do not let material enter sewers or open watersheds. Use manual or mechanical means to pick up material. Place retrieved material in a clean, dry container and cover. Keep unnecessary people away. Isolate hazard area and deny entry.

Dispose of waste and unused material in accordance with Federal, State and Local disposal regulations. Consult appropriate regulatory officials for information on such disposal(s).

EPA HAZARDOUS WASTE NUMBER:	(40 CFR 261.33) N/A
EPA REPORTABLE QUANTITY:	(40 CFR 117.3) N/A
AQUATIC TOXICITY:	No Data

SECTION 7 - HEALTH HAZARD INFORMATION

ROUTES OF ENTRY:	Ingestion, inhalation
TARGET ORGAN(S):	(Zinc Oxide) Respiratory System
ACUTE EXPOSURE:	Skin Contact - Marked irritation Eye Contact - Marked irritation Ingestion - None known or anticipated Inhalation of Dust, Fume or Oxide - Metal fume fever (cough, fever, chills, headache, tight chest, nausea) sweet metal taste, dry throat. Lung damage/edema.
CHRONIC EXPOSURE:	Skin Contact - May cause dermatitis Eye Contact - May cause conjunctivitis Ingestion - None known or anticipated Inhalation of Zinc Oxide Fume - Low pulmonary functioning, dyspnea, rales, fatigue, blurred vision, back pain.

LISTED AS A SUSPECTED OR CONFIRMED CARCINOGEN BY: No agency or review group.

FIRST AID:

Skin Contact - Remove contaminated clothing. Wash affected area(s) with soap or mild detergent and large amounts of water. Seek medical attention.

Eye Contact - Wash eyes with large amounts of water (15 minute minimum) seek medical attention.

Ingestion - If victim is conscious induce vomiting. Seek medical attention.

Inhalation - Remove victim to fresh air environment. If breathing is difficult administer oxygen. If breathing has stopped administer artificial respiration. Keep victim warm and calm. Seek medical attention.

SECTION 8 - PERSONAL PROTECTIVE EQUIPMENT

VENTILATION: Provide local exhaust or process enclosure ventilation to maintain exposure below OSHA guidelines (29 CFR 1910.1000 subpart z).

RESPIRATORS: If exposures cannot be maintained at or below established OSHA guidelines respiratory protection must be provided in accordance with 29 CFR 1910.134 requirements.

GENERAL GUIDE LINES

KNOWN CONCENTRATIONS <PEL with Oxygen levels >19.5% : No respirator required.

KNOWN CONCENTRATIONS >PEL <IDLH with Oxygen levels >19.5% : Air-purifying full facepiece respirator with high-efficient particulate filters.

UNKNOWN CONCENTRATIONS AND/OR >IDLH and/or Oxygen levels <19.5% : Self-contained breathing apparatus with full facepiece operated in pressure-demand or other positive pressure mode. Supplied-air respirator with full facepiece operated in pressure-demand or other positive pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.

SKIN PROTECTION : Wear appropriate protective clothing and chemical resistant gloves as needed to prevent skin contact. Consult manufacturer to determine appropriate type(s) of gloves or clothing for your given application. Clean contaminated clothing and protective equipment before reuse. Wash thoroughly after handling material.

EYE PROTECTION : Where there is a potential for eye contact, wear splash proof or dust proof goggles.

OTHER : As deemed necessary by in-house health & safety staff.

SECTION 9 - SPECIAL PRECAUTIONS AND COMMENTS

STORAGE : No special storage requirements needed.

TRANSPORTATION DATA :

49 CFR	Hazardous Material Description and shipping name	Hazard Class
172.101	Not listed	
172.102	Not listed	
ID Number:	N/A	
Guide Number:	N/A	
Label(s):	N/A	